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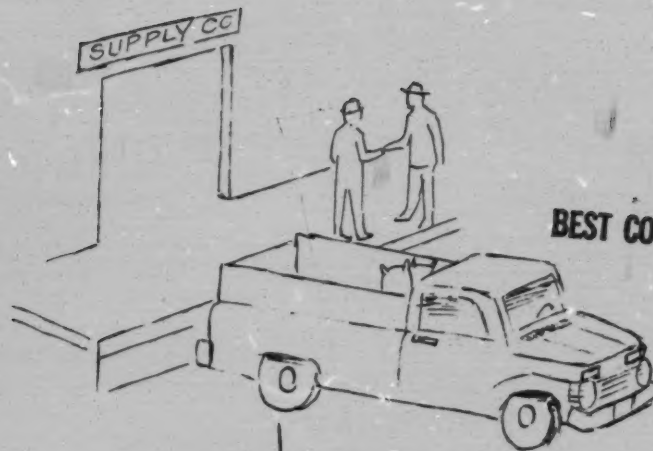
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ABSTRACT

This curriculum guide in agricultural supplies and services is one of 10 guides developed as part of a vocational project stressing agribusiness, natural resources, and environmental protection. The scope of this guide includes four occupational subgroups: feeds, fertilizers, seeds, and chemicals. It is meant as an aid to all who are involved in the curriculum planning phases prior to classroom instruction. Each unit has seven elements to be used for developing specific curriculum and curriculum materials: unit concept, student performance objectives, instructional areas, examples of learning activities, examples of evaluation processes, instructional materials or equipment, and references. Appendixes list recommended materials and equipment, additional references, and selected professional and technical societies. (Author/JC)

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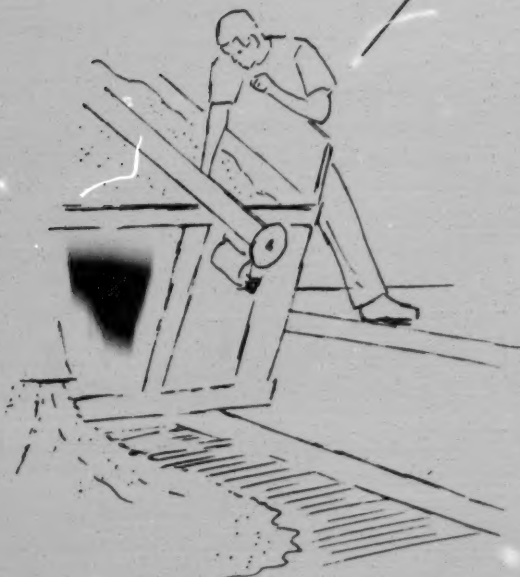
Career Preparation in

AGRICULTURAL SUPPLIES AND SERVICES

A Curriculum Guide

for High School Vocational Agriculture

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OTHER CURRICULUM MATERIALS DEVELOPED BY THIS PROJECT INCLUDE:

CAREER AWARENESS IN AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION: A CURRICULUM GUIDE FOR GRADES K-6.

CAREER EXPLORATION IN AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION: A CURRICULUM GUIDE FOR GRADES 7-9.

CAREER PREPARATION IN AGRICULTURAL PRODUCTION: A CURRICULUM GUIDE FOR HIGH SCHOOL VOCATIONAL AGRICULTURE.

CAREER PREPARATION IN AGRICULTURAL EQUIPMENT AND MECHANICS: A CURRICULUM GUIDE FOR HIGH SCHOOL VOCATIONAL AGRICULTURE.

CAREER PREPARATION IN AGRICULTURAL PRODUCTS (FOOD PROCESSING): A CURRICULUM GUIDE FOR HIGH SCHOOL VOCATIONAL AGRICULTURE.

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CAREER PREPARATION IN ENVIRONMENTAL PROTECTION: A CURRICULUM GUIDE FOR HIGH SCHOOL VOCATIONAL AGRICULTURE.

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BY

OHIO CAREER EDUCATION AND CURRICULUM
MANAGEMENT LABORATORY IN AGRICULTURAL EDUCATION
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO 43210
1974

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FOREWORD

THIS SUGGESTED CURRICULUM GUIDE IN AGRICULTURAL SUPPLIES AND SERVICES IS ONE OF TEN GUIDES DEVELOPED UNDER THE DIRECTION OF THE OHIO CAREER EDUCATION AND CURRICULUM MANAGEMENT LABORATORY, DEPARTMENT OF AGRICULTURAL EDUCATION, COLLEGE OF AGRICULTURE, THE OHIO STATE UNIVERSITY, AS A PART OF THE PROJECT ENTITLED, "CURRICULUM DEVELOPMENT BASIC TO THE TRAINING OF INDIVIDUALS FOR EMPLOYMENT IN AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION." THE PROJECT WAS FUNDED UNDER A CONTRACT WITH THE BUREAU OF OCCUPATIONAL AND ADULT EDUCATION, U.S. OFFICE OF EDUCATION.

THE PROJECT GREW OUT OF THE NEED TO IDENTIFY THE EDUCATIONAL EXPERIENCES MOST APPROPRIATE FOR CAREER DEVELOPMENT IN AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION. EDUCATORS WERE LACKING ADEQUATE AND ACCURATE INFORMATION FOR THE CAREER AWARENESS AND EXPLORATION STAGES OF THE CAREER DEVELOPMENT PROCESS CONCERNING THE AGRIBUSINESS COMPLEX. THE AGRIBUSINESS COMPLEX ALSO HAD SEVERAL EMERGING PROGRAM AREAS WHERE OCCUPATIONAL COMPETENCIES AND THE RELATED CURRICULUM HAD NOT BEEN WELL DEFINED AT THE VOCATIONAL PREPARATION LEVEL. THESE CONDITIONS CAUSED APPROPRIATE CAREER DEVELOPMENT PROGRAMS TO BE LACKING OR INEFFECTIVE AT ALL LEVELS INCLUDING VOCATIONAL EDUCATION.

IN MAY OF 1971, AGRICULTURAL LEADERS REPRESENTING STATE SUPERVISORS, TEACHER EDUCATORS, CLASSROOM TEACHERS AND THE AGRICULTURAL BUSINESS AND INDUSTRIAL COMMUNITY MET IN DENVER, COLORADO, TO DISCUSS THE CHANGING NATURE OF THE FIELD. THERE WAS GENERAL AGREEMENT THAT THE DEVELOPING EMPHASIS ON AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CALLED FOR MAJOR CURRICULUM CHANGES AND DEVELOPMENT OF NEW CURRICULA WITH CHANGES IN THE PREPARATION OF AGRICULTURAL EDUCATION PERSONNEL AT THE SAME TIME.

THE PURPOSES OF THIS PROJECT WERE: (1) TO DEVELOP APPROPRIATE CURRICULUM GUIDES IN AGRIBUSINESS, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION WHICH PROVIDE A COORDINATED EDUCATIONAL PROGRAM INCLUDING CAREER AWARENESS, CAREER EXPLORATION AND PREPARATION FOR A CLUSTER OF OCCUPATIONS; (2) TO ACQUAINT EDUCATIONAL LEADERSHIP IN ALL STATES WITH THE CURRICULUM MATERIALS FROM THIS PROJECT AND PROMOTE THEIR USE; AND (3) TO DISSEMINATE COPIES OF THE CURRICULUM MATERIALS TO LEADERS OF EACH STATE.

ACKNOWLEDGEMENTS

THIS CURRICULUM GUIDE WAS DEVELOPED BY EDGAR P. YODER, CURRICULUM SPECIALIST ASSOCIATE, DEPARTMENT OF AGRICULTURAL EDUCATION, THE OHIO STATE UNIVERSITY, WITH ASSISTANCE FROM THE STAFF OF THE OHIO CAREER EDUCATION AND CURRICULUM MANAGEMENT LABORATORY IN AGRICULTURAL EDUCATION AND THE PROJECT ADVISORY COMMITTEES. APPRECIATION IS FURTHERMORE EXTENDED TO DR. ELIZABETH J. SIMPSON, BRANCH CHIEF, CURRICULUM DEVELOPMENT BRANCH, DIVISION OF RESEARCH AND DEMONSTRATION, BUREAU OF OCCUPATIONAL AND ADULT EDUCATION, AND TO THE LATE DR. PHILLIP TESKE, PROJECT OFFICER, U.S. OFFICE OF EDUCATION, BUREAU OF OCCUPATIONAL AND ADULT EDUCATION, FOR THEIR DIRECTION DURING THE PREPARATION OF THIS GUIDE. ALSO, GRATITUDE IS EXTENDED TO THE TEACHERS AND INDUSTRY PERSONNEL WHO HAVE GIVEN TIME FROM THEIR JOBS TO ASSIST IN A CRITIQUE OF THE GUIDES.

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AGRICULTURAL SUPPLIES AND SERVICES

THE USE OF THIS CURRICULUM GUIDE

THERE IS LESS THAN FULL AGREEMENT ON JUST WHAT CONSTITUTES A PARTICULAR TYPE OF CURRICULUM DOCUMENT. THE CURRICULUM GUIDE IS NO EXCEPTION. THE FOLLOWING IS NOT MEANT AS AN EFFORT TO DEBATE CURRICULUM TERMINOLOGY FURTHER, BUT RATHER TO CLARIFY HOW THIS DOCUMENT CAN BE USED MORE EFFECTIVELY FOR ITS INTENDED PURPOSE.

ENTITLED A CURRICULUM GUIDE, IT IS DESIGNED TO ANSWER THE MORE BASIC QUESTIONS OF CURRICULUM PLANNING AND DEVELOPMENT - WHAT SHOULD BE TAUGHT AND, TO SOME DEGREE, HOW AND WITH WHAT RESOURCES. IT IS NOT INTENDED TO BE TAUGHT FROM NOR TO BE USED AS INSTRUCTIONAL MATERIAL IN THE CLASS BY EITHER TEACHER OR STUDENTS.

IT IS INTENDED TO BE AN AID TO ALL WHO ARE INVOLVED IN THE CURRICULUM PLANNING PHASES PRIOR TO CLASSROOM INSTRUCTION. FOR ADMINISTRATORS AND OTHERS WHO MUST MAKE DECISIONS CONCERNING FACILITIES OR EQUIPMENT, SPECIFICATIONS FOR FACILITIES AND A RECOMMENDED EQUIPMENT LIST ARE INCLUDED. FOR GUIDANCE COUNSELORS OR OTHERS WORKING WITH STUDENTS ON CAREER DECISIONS, INFORMATION IS PROVIDED CONCERNING OCCUPATIONS AND THE TYPE OF COMPETENCIES AND CHARACTERISTICS NEEDED BY THE WORKERS FOR THESE OCCUPATIONS. FOR THE CURRICULUM SPECIALIST, TEACHER EDUCATOR, STATE SUPERVISOR OR OTHERS RESPONSIBLE FOR DETERMINING INSTRUCTIONAL CONTENT AND PREPARING TEACHERS TO CONDUCT INSTRUCTIONAL PROGRAMS, THE GUIDE DEFINES THE NEEDS OF THE STUDENTS IN TERMS OF TERMINAL PERFORMANCES. ALL OTHER ASPECTS OF CURRICULUM CONTENT, TEACHING PROCESSES AND INSTRUCTIONAL RESOURCES ARE BASED UPON THE TERMINAL PERFORMANCE OBJECTIVES FOR THE STUDENTS.

THE SCOPE OF THE GUIDE INCLUDES FOUR OCCUPATIONAL SUBGROUPS WITHIN THE AGRICULTURAL SUPPLIES AND SERVICES AREA. THESE ARE CONSISTENT WITH AND CODED AS DEFINED IN THE STANDARD TERMINOLOGY FOR CURRICULUM AND INSTRUCTION IN LOCAL AND STATE SCHOOL SYSTEMS. THE OVERALL AREA OF AGRICULTURAL SUPPLIES AND SERVICES IS GIVEN THE DESIGNATION 01.02 00 00 00. THE OCCUPATIONAL SUBGROUPS HAVE THE FOLLOWING DESIGNATIONS:

FEEDS	01.02 02 00 00
CHEMICALS	01.02 01 00 00
FERTILIZERS	01.02 04 00 00
SEEDS	01.02 03 00 00

THE OCCUPATIONS CONSIDERED IN THESE FOUR SUBGROUPS ARE LIMITED TO THOSE ON THE CAREER LADDER FOR WHICH HIGH SCHOOL VOCATIONAL INSTRUCTION IS EITHER NECESSARY OR DESIRABLE. THE UNITS WITHIN THE GUIDES ARE BUILT UPON MINIMUM LEVELS OF COMPETENCIES FOR ENTRY LEVEL JOBS. HOWEVER, IT IS ASSUMED THAT, EVEN THOUGH STUDENTS MUST BEGIN AT THIS ENTRY LEVEL JOB, MANY WILL SOON BE STRIVING TO ADVANCE. WHENEVER THE EMPLOYEE IS PRESENTED WITH OTHER DESIRABLE JOB OPPORTUNITIES, IT IS INTENDED THAT HIS VOCATIONAL INSTRUCTION WILL HELP HIM MASTER EARLY JOB OPPORTUNITY ADVANCES IN AN EFFICIENT MANNER.

VARIATION EXISTS BETWEEN STATES IN REGARD TO THE NUMBER OF HOURS OF INSTRUCTION PROVIDED FOR AGRICULTURAL SUPPLIES AND SERVICES. SOME STATES ARE OFFERING A TWO-YEAR AGRICULTURAL SUPPLIES AND SERVICES PROGRAM WHILE OTHER STATES OFFER ONE YEAR OF INSTRUCTION, LABORATORY AND COOPERATIVE ON-THE-JOB EXPERIENCE. WHILE THIS GUIDE MAY NOT COVER ALL INSTRUCTIONAL SEQUENCES WHICH MAY BE POSSIBLE, THERE IS LIKELY TO BE MORE INCLUDED IN THIS GUIDE THAN WOULD BE USED IN ANY TWO-YEAR PROGRAM. IT IS INTENDED THAT THE USERS OF THIS GUIDE WILL SELECT THOSE INSTRUCTIONAL AREAS TO DEVELOP AN INSTRUCTIONAL PACKAGE WHICH MOST APPROPRIATELY MEETS THE STUDENTS' NEEDS IN THAT STATE OR LOCALITY.

BECAUSE MANY AGRICULTURAL SUPPLIES AND SERVICES PROGRAMS ACROSS THE COUNTRY ARE SIMILAR OR, AT LEAST, HAVE SOME COMMON ELEMENTS IN THE CURRICULUM, SOME REDUNDANCY OR DUPLICATION OF EFFORT OCCURS AS THESE PROGRAMS ARE PLANNED AND DEVELOPED. IN PREPARING THIS GUIDE, A MAJOR CONCERN HAS BEEN TO IDENTIFY THOSE PERFORMANCE OBJECTIVES, BASED ON COMPETENCY LISTS, WHICH ARE COMMON TO A LARGE PROPORTION OF THE PROGRAMS. THOSE WHICH ARE ONLY APPROPRIATE TO LIMITED LOCALITIES HAVE NOT BEEN INCLUDED.

IT IS INTENDED THAT THE OBJECTIVES STATED IN THIS GUIDE WOULD SAVE TIME AND EFFORT FOR STATE PERSONNEL WHO HAVE THE RESPONSIBILITY FOR DEFINING THE OCCUPATIONAL COMPETENCIES IN AGRICULTURAL SUPPLIES AND SERVICES.

ONCE THE OBJECTIVES FROM THE GUIDE WHICH ARE COMMON TO THE STATE CURRICULUM NEEDS ARE DEFINED, THEY COULD BE USED TO FACILITATE STATING MORE SPECIFIC LEVELS OF OBJECTIVES. OR, IF OTHER OBJECTIVES ARE MORE APPROPRIATE, THEY COULD BE SUBSTITUTED FOR THOSE PRESENTED AS STATE OR LOCAL CONDITIONS WARRANTED.

ORGANIZATION OF INSTRUCTIONAL UNITS

EACH OF THE UNITS OF INSTRUCTION IN THIS GUIDE IS DEVELOPED AROUND A CLOSELY-RELATED GROUP OF PERFORMANCE OBJECTIVES WHICH IS BASIC TO THE PREPARATION OF INDIVIDUALS FOR ENTRY LEVEL

SKILLED EMPLOYMENT OR EARLY ADVANCEMENT POSITIONS IN AGRICULTURAL SUPPLIES AND SERVICES OCCUPATIONS. THE UNITS ARE ORGANIZED INTO THE FOUR AGRICULTURAL SUPPLY AND SERVICE AREAS OF FEEDS, SEEDS, FERTILIZERS AND CHEMICALS.

THE CURRICULUM CONTENT

THE INSTRUCTIONAL UNITS ARE BASED UPON COMPETENCIES OBTAINED FROM PREVIOUS RESEARCH STUDIES CONDUCTED BY VARIOUS PERSONS AND ORGANIZATIONS THROUGHOUT THE UNITED STATES. IN DETERMINING THE FINAL FORM AND CONTENT OF OUR INSTRUCTIONAL UNITS, ATTENTION WAS ALSO GIVEN TO CURRICULUM GUIDES DEVELOPED BY OTHER INSTITUTIONS AND ORGANIZATIONS IN LIGHT OF THE COMPETENCIES AVAILABLE FOR OCCUPATIONS IN AGRICULTURAL SUPPLIES AND SERVICES.

SOME OF THE MAJOR SOURCES OF OCCUPATIONAL COMPETENCIES THAT WERE CONSULTED OR REFERRED TO IN DEVELOPING THIS CURRICULUM GUIDE ARE LISTED BELOW. THIS IN NO WAY IS INTENDED TO IMPLY THAT THESE ARE THE ONLY AND/OR BEST SOURCES OF COMPETENCIES AVAILABLE. IT IS MERELY A LIST OF THE SOURCES OF COMPETENCIES USED IN DEVELOPING THIS CURRICULUM GUIDE. THE MAJOR COMPETENCY SOURCES UTILIZED WERE:

AGRI-BUSINESS EDUCATION TRAINING PLANS FOR HIGH SCHOOL COOPERATIVE AGRI-BUSINESS EDUCATION PROGRAMS.
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MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY.

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MABON, ELWOOD JACKSON. COMPETENCIES IN AGRICULTURE NEEDED BY MALES EMPLOYED IN COUNTRY ELEVATOR GRAIN MARKETING. AMES, IOWA: VOCATIONAL AGRICULTURAL EDUCATION DEPARTMENT, IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY. 1964.

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VAN LOH, FREDERICK ALVIN. COMPETENCIES IN AGRICULTURE NEEDED BY MALES EMPLOYED IN RETAIL FERTILIZER DISTRIBUTION. AMES, IOWA: VOCATIONAL AGRICULTURAL EDUCATION DEPARTMENT, IOWA STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY. 1964.

FORMAT OF THE UNITS OF INSTRUCTION

EACH OF THE UNITS OF INSTRUCTION HAS SEVEN ELEMENTS TO BE USED FOR DEVELOPING SPECIFIC CURRICULUM AND CURRICULUM MATERIALS. THE LIST OF ELEMENTS INCLUDES:

1. UNIT CONCEPT
2. STUDENT PERFORMANCE OBJECTIVES
3. INSTRUCTIONAL AREAS
4. EXAMPLES OF STUDENT LEARNING ACTIVITIES
5. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCES
6. INSTRUCTIONAL MATERIALS OR EQUIPMENT
7. EXAMPLES OF SUPPORTING REFERENCES

A DESCRIPTION OF THE SEVEN ELEMENTS
OF THE UNITS OF INSTRUCTION

UNIT CONCEPT

THE UNIT CONCEPT DEFINES THE RATIONALE FOR THE AREA COVERED BY THE INSTRUCTIONAL UNIT.

STUDENT PERFORMANCE OBJECTIVES

THE STUDENT PERFORMANCE OBJECTIVES HAVE BEEN CONSIDERED THE BASIC ELEMENT OF THE UNITS OF INSTRUCTION. ALL OTHER ELEMENTS ARE DEVELOPED FROM THE PERFORMANCE OBJECTIVES. THE OBJECTIVES ARE STATED IN STUDENT TERMS AT A TERMINAL PERFORMANCE LEVEL. THE TERMINAL PERFORMANCES HAVE BEEN DEFINED FROM AN ANALYSIS OF COMPETENCIES NECESSARY FOR SUCCESSFUL PERFORMANCE IN THE ENTRY LEVEL SKILLED OCCUPATIONS OF AGRICULTURAL SUPPLIES AND SERVICES.

THE PERFORMANCE OBJECTIVES OF THE GUIDE ARE INTENDED TO AID CURRICULUM SPECIALISTS AND TEACHERS OF LOCAL AGRICULTURAL SUPPLY AND SERVICE PROGRAMS IN DEFINING THE COMPETENCIES WHICH CAN AND SHOULD BE ACQUIRED BY STUDENTS IN LOCAL PROGRAMS.

IT WAS FELT THAT COMPETENT TEACHERS OF A VOCATIONAL PROGRAM WOULD BE IN THE BEST POSITION TO ESTABLISH "HOW WELL" THE OBJECTIVE SHOULD BE PERFORMED, AND THE CONDITIONS UNDER WHICH IT SHOULD BE PERFORMED. HOWEVER, CONDITIONS AND STANDARDS HAVE BEEN INDICATED FOR MOST OBJECTIVES. THE INTENT IS TO DIRECT ATTENTION TO THOSE CONDITIONS WHICH MAY SIGNIFICANTLY AFFECT ACHIEVING THE PERFORMANCE AND IDENTIFY STANDARDS WHICH MAY BE ESPECIALLY IMPORTANT TO SUCCESS IN THE INDUSTRY.

INSTRUCTIONAL AREAS

THE PERFORMANCE OBJECTIVES ARE DESCRIPTIONS OF INTENDED OUTCOMES WHICH REQUIRE THE ACQUISITION OF CERTAIN KNOWLEDGE AND SKILLS. TITLES AND SUBTITLES OF INSTRUCTIONAL AREAS ARE USED TO DEFINE THE RELEVANT CONTENT.

THE TITLES ARE PRESENTED IN AN ACTION FORM AS FAR AS IS FEASIBLE TO HELP DEFINE THE SPECIFIC TYPE OF LEARNING EXPECTED TO ACHIEVE THE OBJECTIVES. RATHER THAN LIMITING THE TITLE BY USING "AGRICULTURAL SUPPLIES AND SERVICES SALESMANSHIP AND SELLING" IN DEFINING THE STUDY AREAS, THE SUBSTUDY AREAS OF DETERMINING THE DUTIES AND RESPONSIBILITIES OF SALES PERSONNEL IN AGRICULTURAL SUPPLY AND SERVICE FIRMS, ASSESSING THE ATTRIBUTES OF SUCCESSFUL SALES PERSONNEL, ADVERTISING AND DISPLAYING ITEMS FOR SALE, APPROACHING AND MEETING THE POTENTIAL CUSTOMER, SECURING AND MAINTAINING CUSTOMER ATTENTION AND INTEREST, HANDLING CUSTOMER OBJECTIONS, AND CLOSING THE SALE ARE USED. THE GERUND VERB FORM OR "-ING" FORM OF THE TITLE IS TO AID IN MORE SPECIFICALLY DEFINING THE COMPETENCIES TO BE BROUGHT OUT IN THE LEARNING PROCESSES.

BECAUSE OF THE SPECIFIC NATURE OF MUCH OF THE LEARNING MATERIALS NEEDED FOR THESE INSTRUCTIONAL AREAS, REFERENCES ARE CITED WHICH WOULD BE APPROPRIATE FOR CURRICULUM DEVELOPERS. THE TITLES FOR THE INSTRUCTIONAL AREAS ARE OF A RELATIVELY PERMANENT NATURE AND COMMON TO MOST PROGRAMS. THE SPECIFIC CONTENT TO SUPPORT THEM IS MUCH MORE ADVERSELY AFFECTED BY CHANGES IN TECHNOLOGY, GEOGRAPHICAL DIFFERENCES OR DIFFERENCES IN LOCAL OCCUPATIONAL CHARACTERISTICS.

IT MAY BE POSSIBLE TO USE THE SUGGESTED TITLES OVER A PERIOD OF TIME WITH RELATIVELY MINOR ADJUSTMENTS. SPECIFIC CONTENT, ON THE OTHER HAND, NEEDS TO BE CONTINUALLY UPDATED TO CURRENT CONDITIONS AND MATCHED WITH LOCAL STUDENT NEEDS AND OCCUPATIONAL CHARACTERISTICS.

THE NUMBERS OF THE INSTRUCTIONAL AREA TITLES ARE NOT MATCHED TO THE NUMBERS OF THE STUDENT PERFORMANCE OBJECTIVES. HOWEVER, INSTRUCTIONAL AREAS RELATING TO AN OBJECTIVE CAN BE DETERMINED RELATIVELY EASILY.

EXAMPLES OF STUDENT LEARNING ACTIVITIES

EXAMPLES ARE PROVIDED SUGGESTING WAYS IN WHICH STUDENTS MAY BE ACTIVELY INVOLVED IN LEARNING ACTIVITIES THAT WOULD HELP THEM ACHIEVE THE OBJECTIVES. THEY ARE OFFERED AS ONE APPROACH THAT MAY BE USED RATHER THAN INTENDED TO BE THE COMPLETE LIST OF ACTIVITIES WHICH WOULD PROVIDE THE MOST EFFECTIVE LEARNING. THE SUGGESTED ACTIVITIES FOR EACH OBJECTIVE MAY OR MAY NOT COVER THE ENTIRE OBJECTIVE. THEREFORE, DEVELOPMENT OF OTHER ACTIVITIES FOR THE LOCAL PROGRAM WILL BE NECESSARY.

THERE IS AT LEAST ONE ACTIVITY FOR EACH STUDENT PERFORMANCE OBJECTIVE. THE NUMBER ON THE ACTIVITY IS THE SAME AS THE STUDENT PERFORMANCE OBJECTIVE TO WHICH IT IS RELATED.

EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

THE STUDENT EVALUATION SHOULD BE DIRECTED TOWARD AND BASED UPON WELL-WRITTEN STUDENT PERFORMANCE OBJECTIVES. IN THIS GUIDE, THE STUDENT PERFORMANCE OBJECTIVES ARE INTENDED TO BE EXPLICITLY STATED IN THE TERMINAL PERFORMANCE THE STUDENT IS TO BE ABLE TO DO AND, TO SOME DEGREE, HOW WELL AND UNDER WHAT CONDITIONS. PRIMARILY, THE EVALUATION IS TO USE THE STATED OBJECTIVES AS A REFERENCE POINT TO ANSWER THE QUESTION - "CAN THE STUDENT ACHIEVE THE DESIRED PERFORMANCE LEVEL?"

IN ADDITION, AN ELEMENT DESIGNATED AS "EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE" IS INCLUDED IN EACH UNIT OF INSTRUCTION. EXAMPLES OF EVALUATION PROCESSES ARE INTENDED TO ASSIST IN DETERMINING THE STUDENT'S LEVEL OF UNDERSTANDING OR LEVEL OF PERFORMANCE. THESE PROCESSES ARE NOT INTENDED TO REPLACE A DIRECT EVALUATION OF THE TERMINAL PERFORMANCE AS STATED IN THE OBJECTIVE.

THE TYPE OF EVALUATION PROCESS IS DETERMINED IN PART BY THE NATURE OF THE PERFORMANCE OBJECTIVES. BUT THE MOST DESIRABLE METHOD CAN BE BEST DETERMINED WHEN THERE IS KNOWLEDGE OF THE LOCAL SITUATION, SUCH AS, EDUCATIONAL RESOURCES, SCHOOL POLICIES AND THE NEEDS OF THE STUDENTS.

THERE IS AT LEAST ONE EVALUATION PROCESS FOR EACH STUDENT PERFORMANCE OBJECTIVE. THE NUMBER ON THE EVALUATION ACTIVITY IS THE SAME AS THE STUDENT PERFORMANCE OBJECTIVE TO WHICH IT IS RELATED.

INSTRUCTIONAL MATERIALS OR EQUIPMENT

MATERIALS OR EQUIPMENT ARE NOTED WHICH ARE SPECIFIC TO THE UNIT AND WHICH ARE CONSIDERED ESSENTIAL OR QUITE DESIRABLE IN THE LEARNING PROCESS. IN SOME CASES, THE OBJECTIVES WOULD BE QUITE DIFFICULT TO ACHIEVE, IF AT ALL, WITHOUT THE MATERIALS. IN OTHERS, THE MATERIALS OR EQUIPMENT AID IN THE EFFECTIVENESS OR EFFICIENCY OF LEARNING.

THE MATERIALS AND EQUIPMENT SUGGESTED FOR ONE UNIT ARE NOT NECESSARILY CONSUMED OR UNIQUE JUST TO THE LEARNING ACTIVITIES OF THAT UNIT. A LIST OF THE EQUIPMENT SUGGESTED FOR AGRICULTURAL SUPPLIES AND SERVICES PROGRAMS IS LISTED IN APPENDIX A.

EXAMPLES OF SUPPORTING REFERENCES

A LIMITED NUMBER OF REFERENCES HAS BEEN LISTED WHICH DIRECTLY RELATES TO THE CURRICULUM STUDY AREAS SUGGESTED IN THE "INSTRUCTIONAL AREAS" SECTION. THESE REFERENCES ARE AVAILABLE AND THE SOURCES OR DETAILS OF SECURING THEM ARE LOCATED IN APPENDIX B OF THIS GUIDE.

WHEN TWO OR MORE REFERENCES ARE FOUND TO HAVE ADEQUATE LEARNING MATERIALS AND PROCESSES FOR THE OBJECTIVES OF A UNIT BUT HAVE UNIQUELY DIFFERENT STYLES, THE GROUP MAY BE LISTED SO THAT THE TEACHER HAS THE CHOICE OF SELECTING THE ONE MOST SUITED TO HIS TEACHING.

IN SOME CASES, SEVERAL REFERENCES ARE NOTED BECAUSE NO ONE REFERENCE ADEQUATELY COVERS ALL OF THE OBJECTIVES OF A UNIT OR STUDY AREA. ANNOTATIONS OF THE REFERENCES ARE PROVIDED TO AID IN DETERMINING WHICH REFERENCE OR REFERENCES WOULD BE BEST SUITED FOR A LOCAL PROGRAM. THE REFERENCE SUGGESTED FOR ONE UNIT IS OFTEN RELEVANT TO AND SUGGESTED FOR USE IN SEVERAL OF THE UNITS. IN NO WAY SHOULD THE REFERENCES BE CONSIDERED THE BEST OR ONLY REFERENCES TO BE USED WITH THE UNITS.

RECOMMENDED FACILITIES AND EQUIPMENT

SUGGESTIONS FOR PLANNING THE FACILITIES FOR AGRICULTURAL SUPPLY AND SERVICE PROGRAM

THE NATURE AND THE EXTENT OF THE FACILITIES NEEDED FOR AGRICULTURAL SUPPLIES AND SERVICES INSTRUCTION WILL BE INFLUENCED BY THE PROJECTED ENROLLMENTS, THE PLANNED USE OF THE FACILITIES FOR CONTINUING EDUCATION AND OTHER GROUPS, AND THE AREAS OF EMPHASIS TO BE INCLUDED IN THE COURSE OF STUDY. THE SUGGESTIONS WHICH FOLLOW ARE TO BE CONSIDERED ONLY AS GUIDES FOR SCHOOL FACILITY PLANNERS AND ARCHITECTS.

SPACE ALLOCATIONS

RECOMMENDED MINIMUM SPACE ALLOCATIONS FOR ACCOMODATING TWENTY STUDENTS PER SECTION INCLUDE:

CLASSROOM AND LABORATORY COMBINATION - 1000 SQUARE FEET
STORAGE ROOM - 150 SQUARE FEET
OFFICE/CONFERENCE ROOM - 150 SQUARE FEET



CLASSROOM

THE CLASSROOM SHOULD BE EQUIPPED WITH MOVABLE CHAIRS AND TABLES TO ACCOMMODATE A MINIMUM OF 20 STUDENTS, SUFFICIENT TACK BOARD AND CHALKBOARD SPACE, A TEACHER'S DESK, FILING CABINETS, SHELF SPACE, STORAGE CABINETS, A PROJECTION SCREEN, AND ADEQUATE ELECTRICAL OUTLETS.

CONSIDERATION SHOULD ALSO BE GIVEN TO PROVIDING AT LEAST TWO DISPLAY WINDOWS, SHELVING, A COUNTER, AND A BUILT-IN DESK TO SIMULATE A STORE.

STORAGE ROOM

THE STORAGE ROOM SHOULD BE LARGE ENOUGH TO STORE AUDIO-VISUAL EQUIPMENT, TEACHING MATERIALS AND SUPPLIES IN CLASSROOM QUANTITIES. ADJUSTABLE SHELVES AND STORAGE CABINETS SHOULD BE PROVIDED IN THIS ROOM. CONSIDERATION SHOULD BE GIVEN TO HAVING A SMALL WORK COUNTER IN THE STORAGE ROOM WITH A WASH BASIN AND HOT AND COLD WATER AVAILABLE.

OFFICE/CONFERENCE ROOM

THE OFFICE/CONFERENCE ROOM SHOULD BE EQUIPPED WITH A TEACHER'S DESK AND CHAIR FOR EACH TEACHER IN THE AGRICULTURAL SUPPLY AND SERVICE PROGRAM, SEVERAL MOVABLE TABLES AND CHAIRS, FILING CABINETS, STORAGE SHELVES, SUFFICIENT ELECTRICAL OUTLETS, AND A TELEPHONE.

SUGGESTIONS FOR DEVELOPING LISTS OF NEEDED EQUIPMENT AND SUPPLIES

THE TYPE AND QUANTITIES OF EQUIPMENT AND SUPPLIES REQUIRED TO PROVIDE EFFECTIVE OCCUPATIONAL EDUCATION IN AGRICULTURAL SUPPLIES AND SERVICES PROGRAMS WILL DEPEND UPON SEVERAL FACTORS. THESE INCLUDE: THE ANTICIPATED SIZES OF THE GROUPS TO BE SERVED; THE TYPES OF GROUPS TO BE SERVED, THAT IS, SECONDARY OR ADULT; AND THE EMPHASIS TO BE INCLUDED IN THE COURSE OF STUDY IN TERMS OF THE DIVERSIFICATION OR SPECIALIZATION.

THE OPTIMUM CLASS SIZE IS CONSIDERED, FOR PLANNING PURPOSES, TO BE 20 PUPILS. SUFFICIENT QUANTITIES OF MATERIALS, EQUIPMENT AND SUPPLIES SHOULD BE PROVIDED TO MAKE MAXIMUM USE OF THE TIME AVAILABLE FOR LABORATORY AND PRACTICAL EXERCISES. THIS WILL NOT REQUIRE NECESSARILY THAT 20 DUPLICATES OF A SPECIFIC ITEM WILL BE NEEDED AS PROPER MANAGEMENT OF PRACTICAL SITUATIONS WILL SELDOM RESULT IN EACH PUPIL USING THE IDENTICAL ITEM AT THE SAME TIME.

AN ADVISORY COMMITTEE COMPOSED OF REPRESENTATIVES FROM LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRMS MAY PROVIDE INVALUABLE ASSISTANCE IN DEVELOPING LISTS OF NEEDED EQUIPMENT AND SUPPLIES.

A LIST OF EQUIPMENT THAT CAN BE USED AS A GUIDE IN ORDERING AND ASSEMBLING THOSE ITEMS NEEDED IS LOCATED IN APPENDIX A. MANY STATE DEPARTMENTS HAVE MORE DEFINITIVE LISTS AVAILABLE, AND IT MAY BE DESIRABLE TO REQUEST SUCH LISTS AS ADDITIONAL SOURCES OF INFORMATION.

TEACHER REQUIREMENTS AND RESPONSIBILITIES

THE EFFECTIVENESS OF AN AGRICULTURAL SUPPLY AND SERVICE PROGRAM DEPENDS LARGELY UPON THE EXPERIENCE, EDUCATIONAL BACK-GROUNDS, AND PERSONAL QUALITIES OF THE FACULTY. IT IS DESIRABLE THAT THE TEACHERS HAVE HAD OCCUPATIONAL EXPERIENCE IN THE AREA OF AGRICULTURAL SUPPLIES AND SERVICES AND MEET CERTIFICATION REQUIREMENTS ESTABLISHED BY THE STATE DEPARTMENT OF EDUCATION.

THE TEACHER(S) SHOULD UNDERSTAND THE EDUCATIONAL PHILOSOPHY, THE OBJECTIVES AND THE SPECIFIC REQUIREMENTS OF THE PROGRAM. THEY WILL NEED TO BE ABLE TO ORGANIZE AND DEVELOP PROGRAMS FOR EACH INDIVIDUAL SO THAT STUDENTS MEET THE REQUIREMENTS OF THE OCCUPATIONAL CLUSTER(S) THEY ARE PREPARING TO ENTER.

RESPONSIBILITIES OF THE TEACHER(S) INCLUDES:

1. PLANNING A PROGRAM OF AGRICULTURAL SUPPLIES AND SERVICES INCLUDING WORKING WITH ADVISORY COMMITTEES AND DEVELOPING A CURRICULUM TO FIT LOCAL NEEDS
2. TEACHING CLASSES
3. SUPERVISING OCCUPATIONAL EXPERIENCE PROGRAMS
4. SELECTING AND UTILIZING FACILITIES AND EQUIPMENT
5. ADVISING YOUTH ORGANIZATIONS
6. INFORMING THE PUBLIC REGARDING THE PROGRAM, ITS ACTIVITIES AND STUDENTS' PROGRESS
7. UTILIZING COMMUNITY RESOURCES
8. PROVIDING SAFETY INSTRUCTION AND PRACTICES
9. GUIDING AND COUNSELING STUDENTS
10. PLACEMENT AND FOLLOW-UP OF STUDENTS

MOTIVATION AND MORALE BUILDING SHOULD BE A PART OF EVERY CLASS AND LABORATORY PERIOD. IT IS SUGGESTED THAT THE INSTRUCTOR MAKE AN EFFORT EARLY IN THE PROGRAM TO ESTABLISH AN ENVIRONMENT WHICH WILL HEIGHTEN AND MAINTAIN THE STUDENT'S INTEREST.

THE INSTITUTION MUST INSURE THAT ITS FACULTY WORKLOAD PERMITS TIME FOR INDIVIDUAL AND DEPARTMENTAL ACTIVITIES AS WELL AS THE SUPERVISION OF STUDENTS ON THE JOB. FACULTY MEMBERS SHOULD HAVE APPROPRIATE TRAINING AIDS AND SUPPLEMENTAL MATERIAL FOR THEIR RESPECTIVE COURSES AND A WORKING KNOWLEDGE OF WHAT OTHERS ARE TEACHING IN AGRICULTURAL SUPPLY AND SERVICE PROGRAMS.

FACULTY MEMBERS SHOULD BE ENCOURAGED TO PARTICIPATE IN ACTIVITIES AND ORGANIZATIONS WHICH LEAD TO PERSONAL PROFESSIONAL DEVELOPMENT THROUGH OFFERING RELEASED TIME AND FINANCIAL ASSISTANCE FOR IN-SERVICE TRAINING. THE IN-SERVICE TRAINING PROGRAM SHOULD BE DEVELOPED TO STRENGTHEN INDIVIDUAL WEAKNESSES. ONE TEACHER MAY PROFIT MORE FROM SUMMER EMPLOYMENT IN INDUSTRY, WHILE ANOTHER SHOULD ATTEND FORMAL CLASSES. MAINTAINING CLOSE CONTACT WITH PRACTITIONERS AND CURRENT LITERATURE IN THE FIELD THROUGH SPECIAL INSTITUTES AND CONFERENCES SHOULD PROVIDE A BASIS FOR CONSTANT UPDATING OF MATERIAL FOR THEIR COURSES.

ADVISORY COMMITTEES

ADVISORY COMMITTEES UTILIZING COMMUNITY RESOURCE PERSONS CAN ASSIST THE SECONDARY INSTITUTION ADMINISTRATION IN PLANNING AND IMPLEMENTING AGRICULTURAL SUPPLY AND SERVICE PROGRAMS TO MEET THE OBJECTIVES OF THE INSTITUTION, THE STUDENT AND THE COMMUNITY.

THE SPECIAL ADVISORY COMMITTEE FOR THE AGRICULTURAL SUPPLY AND SERVICE OCCUPATIONAL PROGRAMS SHOULD INCLUDE REPRESENTATIVES OF EMPLOYERS AND PUBLIC EMPLOYMENT SERVICES, SCIENTIFIC OR TECHNICAL SOCIETIES AND ASSOCIATIONS IN THE FIELD AND KNOWLEDGEABLE CIVIC LEADERS WHO MEET WITH AND ADVISE THE SPECIALISTS ON THE SCHOOL STAFF. THE COMMITTEE NORMALLY CONSISTS OF ABOUT NINE TO TWELVE MEMBERS WHO GENERALLY SERVE FOR A ONE- TO THREE-YEAR PERIOD. THE HEAD OF THE INSTITUTION OR THE DEPARTMENT HEAD IS ORDINARILY CHAIRMAN. MEMBERS ARE APPOINTED FOR REGULAR TERMS, SUBJECT TO REAPPOINTMENT, AND MEMBERSHIP SHOULD ROTATE SO THAT SOME EXPERIENCED ADVISORY COMMITTEE MEMBERS ARE PRESENT WITH SOME NEW MEMBERS EACH TERM. IT SHOULD BE REMEMBERED THAT ADVISORY COMMITTEE PEOPLE ARE BUSY; THEREFORE, MEETINGS SHOULD BE CALLED ONLY WHEN COMMITTEE ACTION CAN BEST HANDLE A SPECIFIC TASK OR PROBLEM.

LETTERS OF APPOINTMENT SHOULD COME FROM THE CHIEF SCHOOL ADMINISTRATOR. WHILE THE COMMITTEE FUNCTIONS WITHOUT LEGAL STATUS OR POWERS, IT CAN PROVIDE INVALUABLE ASSISTANCE TO THE INSTITUTION BY ASSISTING IN A FEASIBILITY STUDY OF PROPOSED NEW

EDUCATIONAL PROGRAMS, BY PROVIDING SUPPORT TO SCHOOL ADMINISTRATORS IN OBTAINING APPROPRIATIONS AND STATE AND FEDERAL SUPPORT TO FINANCE THE PROGRAMS, BY ASSISTING IN THE LOCATION OF WORK EXPERIENCE STATIONS, BY SURVEYING AND DEFINING THE KNOWLEDGE AND SKILLS NEEDED BY AGRICULTURAL SUPPLY AND SERVICE WORKERS, AND BY ASSISTING IN THE PLACEMENT OF GRADUATES (IN JOBS).

SCIENTIFIC AND TECHNICAL SOCIETIES AND TRADE ASSOCIATIONS

SCIENTIFIC AND TECHNICAL SOCIETIES AND COMMERCIAL FIRMS AND TRADE GROUPS ARE AN IMPORTANT SOURCE OF INSTRUCTIONAL MATERIALS AND OTHER BENEFITS FOR TEACHERS AND STUDENTS. THESE SOCIETIES, IN THEIR PUBLICATIONS AND AT MEETINGS, PROVIDE CONTINUAL EXPOSURE TO THE MOST RECENT DEVELOPMENTS IN THE SCIENCE AND RELATED TECHNOLOGIES AND PROBABLY SERVE AS THE BEST MEANS FOR HELPING PERSONS KEEP UP-TO-DATE IN A PARTICULAR PHASE OF SCIENCE.

THESE ASSOCIATIONS AND FIRMS MAY ASSIST TEACHERS: (1) IN HELPING TO DEVELOP EVIDENCE OF THE NEED FOR THE TRAINING PROGRAM; (2) IN HELPING TO PROMOTE THE PROGRAM; (3) IN ENLISTING MEMBERS' SUPPORT FOR THE PROGRAM; (4) IN HELPING TO PROVIDE WORK EXPERIENCE FOR STUDENTS; AND (5) IN HELPING WITH THE PLACEMENT OF GRADUATES.

ASSOCIATIONS AND SOCIETIES MAY SUPPLY RESOURCE PEOPLE TO SPEAK TO CLASSES. THEY MAY ALSO SERVE AS HOSTS TO STUDENT GROUPS ON FIELD TRIPS TO STUDY SPECIFIC PHASES OF THE INDUSTRY.

THE FOLLOWING IS A SELECTED LISTING OF SOME OF THE ORGANIZATIONS:*

AGRICULTURAL NITROGEN INSTITUTE
 AMERICAN DEHYDRATORS ASSOCIATION
 AMERICAN FEED MANUFACTURERS ASSOCIATION, INC.
 AMERICAN POTASH INSTITUTE, INC.
 ARIZONA GRAIN & SEED ASSOCIATION
 ARKANSAS DRIER & WAREHOUSEMAN'S ASSOCIATION, INC.
 CALIFORNIA GRAIN AND FEED ASSOCIATION
 CALIFORNIA WAREHOUSEMEN'S ASSOCIATION
 CAROLINA-VIRGINIA GRAIN AND FEED DEALERS ASSOCIATION
 COLORADO GRAIN & FEED DEALERS ASSOCIATION
 DISTILLERS FEED RESEARCH COUNCIL, INC.
 DULUTH GRAIN COMMISSION MERCHANTS' ASSOCIATION
 EASTERN FEDERATION OF FEED MERCHANTS, INC.
 EASTERN SHORE GRAIN & FEED DEALERS ASSOCIATION

* SEE APPENDIX C FOR A COMPLETE ADDRESS OF THESE ORGANIZATIONS AND ASSOCIATIONS

FARMERS ELEVATOR ASSOCIATION OF MINNESOTA
FARMERS ELEVATOR ASSOCIATION OF SOUTH DAKOTA
FARMERS GRAIN DEALERS ASSOCIATION OF NORTH DAKOTA
FEDERATION OF CASH GRAIN COMMISSION MERCHANTS ASSOCIATION

THE FERTILIZER INSTITUTE
FLORIDA FEED ASSOCIATION, INC.
GEORGIA FEED ASSOCIATION, INC.
GEORGIA GRAIN DEALERS ASSOCIATION, INC.
GRAIN ELEVATOR & PROCESSING SUPERINTENDENTS ASSOCIATION
GRAIN & FEED ASSOCIATION OF ILLINOIS
IDAHO FEED AND GRAIN ASSOCIATION, INC.
INDIANA GRAIN & FEED DEALERS ASSOCIATION, INC.
IOWA FERTILIZER & CHEMICAL ASSOCIATION
IOWA GRAIN & FEED ASSOCIATION
KANSAS GRAIN & FEED DEALERS ASSOCIATION
KENTUCKY FEED & GRAIN ASSOCIATION
LOUISIANA GRAIN & FEED DEALERS ASSOCIATION, INC.
MICHIGAN BEAN SHIPPERS ASSOCIATION
MICHIGAN GRAIN & AGRI-DEALERS ASSOCIATION
MIDSOUTH SOYBEAN & GRAIN SHIPPERS ASSOCIATION
MIDWEST FEED MANUFACTURERS' ASSOCIATION
THE MINNEAPOLIS GRAIN COMMISSION MERCHANTS ASSOCIATION
MISSISSIPPI FEED & GRAIN ASSOCIATION
MISSOURI AG-INDUSTRIES COUNCIL, INC.
NATIONAL FERTILIZER SOLUTIONS ASSOCIATION
NATIONAL GRAIN & FEED ASSOCIATION
NEBRASKA GRAIN & FEED DEALERS ASSOCIATION
NEW ENGLAND GRAIN & FEED COUNCIL
NEW MEXICO GRAIN & FEED DEALERS ASSOCIATION
NORTHEASTERN POULTRY PRODUCERS COUNCIL
NORTHWEST AGRI-DEALERS ASSOCIATION, INC.
NORTHWEST COUNTRY ELEVATOR ASSOCIATION
N.W. FEED MANUFACTURERS ASSOCIATION
OHIO AGRICULTURAL COUNCIL
OHIO GRAIN, FEED AND FERTILIZER ASSOCIATION, INC.
OHIO PESTICIDE INSTITUTE
OHIO SOIL FERTILITY & EDUCATION SOCIETY
OKLAHOMA GRAIN & FEED DEALERS ASSOCIATION
OMAHA CASH GRAIN COMMISSION MERCHANTS' ASSOCIATION
OREGON FEED, SEED & SUPPLIERS ASSOCIATION
PACIFIC NORTHWEST GRAIN DEALERS ASSOCIATION, INC.
PANHANDLE GRAIN & FEED DEALERS ASSOCIATION
PENN AG INDUSTRIES
SIOUX CITY GRAIN & FEED ASSOCIATION
SOUTH DAKOTA FERTILIZER & AG CHEMICAL ASSOCIATION
SOUTH TEXAS COUNTRY ELEVATOR ASSOCIATION, INC.
TEXAS GRAIN & FEED ASSOCIATION
UTAH FEED MANUFACTURERS & DEALERS ASSOCIATION
WEST TEXAS GRAIN ELEVATOR ASSOCIATION

WEST VIRGINIA FEED DEALERS ASSOCIATION
WISCONSIN FEED, SEED & FARM SUPPLY ASSOCIATION, INC.
THE WYOMING GRAIN, FEED AND SEED DEALERS ASSOCIATION

EMPLOYMENT OPPORTUNITIES IN AGRICULTURAL SUPPLY AND SERVICE FIRMS

A GENERALLY ACCEPTED DEFINITION OF THE SCOPE OF THE AGRICULTURAL SUPPLIES AND SERVICES CURRICULUM AREA, AS DEVELOPED FROM THE DEFINITIONS IN VOCATIONAL EDUCATION AND OCCUPATIONS (U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE, 1969) AND STANDARD TERMINOLOGY FOR CURRICULUM AND INSTRUCTION IN LOCAL AND STATE SCHOOL SYSTEMS (U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE, 1970), IS AS FOLLOWS:

A COMBINATION OF SUBJECT MATTER, LABORATORY AND/OR COOPERATIVE TRAINING EXPERIENCES WHICH ARE DESIGNED TO DEVELOP IN PUPILS THE CAPABILITIES NECESSARY FOR ENTRY AND ADVANCEMENT IN OCCUPATIONS DEALING WITH THE PREPARATION, MARKETING AND DISTRIBUTION OF CONSUMABLE SUPPLIES AND PROVIDING SERVICES IN THE FEED, SEED, FERTILIZER AND CHEMICAL INDUSTRIES PERTINENT TO PRODUCTION AGRICULTURE.

EMPLOYMENT OPPORTUNITIES IN THE AGRICULTURAL SUPPLY AND SERVICE FIRMS WILL VARY FROM REGION TO REGION. IT IS RECOMMENDED THAT EACH STATE AND LOCAL AREA SURVEY THEIR PUBLICS TO ASSESS THE POTENTIAL FOR EMPLOYMENT OPPORTUNITIES IN THE AGRICULTURAL SUPPLY AND SERVICE FIRMS. THE RESULTS OF SUCH A SURVEY SHOULD BE UTILIZED BEFORE DECISIONS ARE MADE TO IMPLEMENT AND OPERATE PROGRAMS IN LOCAL SCHOOLS TO PREPARE PERSONS FOR EMPLOYMENT IN AGRICULTURAL SUPPLY AND SERVICE FIRMS.

THE TOTAL CAREER LADDER IN AGRICULTURAL SUPPLIES AND SERVICES MAY BEST BE ILLUSTRATED BY THE CHART WHICH WAS DEVELOPED BY THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION IN AUGUST, 1965. CHART I WHICH FOLLOWS (TAKEN FROM RESEARCH FINDINGS IN OFF-FARM AGRICULTURAL OCCUPATIONS, THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, P. 12) ILLUSTRATES THE CAREER LADDER IN AGRICULTURAL SUPPLIES AND SERVICES.

Occupational Titles in AGRICULTURAL SUPPLIES
by Field of Activity
(with related titles used in some businesses or states)

Field of Activity	Occupational Titles	Related Titles and Other Designations	D.O.T. No.
Managerial	Agricultural Supplies Manager		185.186
	Ag. Supplies Department Manager	Ag. Supplies Product Manager	185.168
		Ag. Supplies Sales Manager	185.168
		Ag. Supplies Service Manager	187.168
		Ag. Supplies Office Manager	185.168
Professional	Ag. Supplies Research and Development Director	Agronomist Nutritionist Entomologist Pathologist	189.118
Technical	Ag. Supplies Fieldman	Feed Specialist	180.118
		Seed Specialist	
		Fertilizer Specialist	
		Chemicals Specialist	
		Petroleum Specialist	
		Equipment Specialist	
Clerical	Ag. Supplies Bookkeeper	Ag. Supplies Office Clerk	210.388
	Ag. Supplies Secretary		
Sales	Ag. Supplies Salesman	Ag. Supplies Sales Supervisor	277.358
		Ag. Supplies Product Salesman	
	Ag. Supplies Sales Clerk		
Service	Ag. Supplies Serviceman	Ag. Supplies Service Supervisor	638.281 424. 883
		Ag. Supplies Service Mechanic	
		Ag. Supplies Applicator	

Occupational Titles in AGRICULTURAL SUPPLIES (cont.)

Field of Activity	Occupational Titles	Related Titles and Other Designations	D.O.T. No.
Service (cont.)	Ag. Supplies Equipment Operator	Ag. Supplies Mill Operator	520.885
	Ag. Supplies Worker	Ag. Supplies Warehouseman	922.887
		Ag. Supplies Maintenance Worker	638.281
	Ag. Supplies Delivery-man	Ag. Supplies Truck Driver	905.883

FROM THE LIST OF OCCUPATIONS IN AGRICULTURAL SUPPLIES AND SERVICES, THE FOLLOWING OCCUPATIONS WERE IDENTIFIED BY THE NATIONAL BUSINESS ADVISORY COMMITTEE TO THE PROJECT AS ENTRY LEVEL OR EARLY ADVANCEMENT OCCUPATIONS FOR WHICH HIGH SCHOOL INSTRUCTIONAL PROGRAMS WERE DESIRABLE:

MAJOR OCCUPATIONAL GROUP:	ENTRY LEVEL SKILLED OCCUPATION:	D.O.T. No.:
FEEDS	FEED MIXER	520.885
	FEED MIXER HELPER	520.886
	CUSTOM FEED MILL OPERATOR HELPER	521.886
	FEED WAREHOUSEMAN	922.887
	AGRICULTURAL SALES CLERK OR FEED SALES (COUNTER)	277.358
	FEED DELIVERYMAN	905.883
	FEED TRUCK DRIVER HELPER	905.887
FERTILIZERS	AGRICULTURAL SALES CLERK OR FERTILIZER SALES (COUNTER)	277.358
	FERTILIZER WAREHOUSEMAN	922.887
	FERTILIZER DELIVERYMAN	906.883
	FERTILIZER AND LIME TRUCK DRIVER (HEAVY)	905.883
SEEDS	SEED FIRM HELPER	520.886
	SEED CLEANER OPERATOR	551.885
	SEED WAREHOUSEMAN	922.887
	AGRICULTURAL SALES CLERK OR SEED SALES (COUNTER)	277.358

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MAJOR OCCUPATIONAL
GROUP:ENTRY LEVEL
SKILLED OCCUPATION:D.O.T.
No.

CHEMICALS

SCOUT (AGRI.)	465.381
AGRICULTURAL SALES CLERK OR	
CHEMICAL SALES (COUNTER)	277.358
CHEMICAL APPLICATOR (AGRI.)	424.883
CHEMICAL APPLICATOR HELPER	
OR SPRAYER HAND	465.887
CHEMICAL WAREHOUSEMAN	922.887

VALIDATION OF AGRICULTURAL SUPPLIES AND SERVICES UNITS

THE AGRICULTURAL SUPPLIES AND SERVICES UNITS HAVE BEEN DEVELOPED THROUGH THE USE OF MANY VARYING CURRICULUM GUIDES AND INSTRUCTIONAL MATERIALS ACCUMULATED FROM VARIOUS SOURCES THROUGHOUT THE UNITED STATES. THESE CURRICULUM GUIDES AND INSTRUCTIONAL MATERIALS RANGED FROM TOPIC OUTLINES TO COMPREHENSIVE REFERENCE MATERIALS. THE UNITS CONTAINED IN THIS GUIDE WILL HOPEFULLY PROVIDE A COMPREHENSIVE BASE FOR PROGRAM PLANNING AND DEVELOPMENT BY STATE CURRICULUM PLANNERS, STATE SUPERVISORS AND TEACHERS IN DEVELOPING LOCAL PROGRAMS.

MUCH OF THE MATERIAL IN THIS GUIDE IS BASED ON CURRICULUM GUIDES AND OTHER CURRICULUM MATERIALS DEVELOPED BY OTHER STATES. REFERENCE TO THESE GUIDES IS MADE IN APPENDIX D.

THE UNITS INCLUDED IN THIS GUIDE HAVE BEEN REVIEWED BY VARIOUS AGRICULTURAL SUPPLIES AND SERVICES INSTRUCTORS IN LOCAL PROGRAMS. THESE TEACHERS REPRESENT A BROAD BASE OF EXPERIENCE IN THE VARIOUS AREAS OF AGRICULTURAL SUPPLIES AND

ANOTHER PHASE OF THE VALIDATION PROCESSES INCLUDED THE REVIEW OF THE GUIDE BY STATE AND NATIONAL CURRICULUM SPECIALISTS. THESE INDIVIDUALS ARE INVOLVED WITH DEVELOPING CURRICULUM MATERIALS FULL TIME AND PROVIDED VALUABLE INPUT DURING THE REVISION OF THIS GUIDE.

I

AGRICULTURAL SUPPLIES AND SERVICES

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UNITS GENERAL TO THE AGRICULTURAL SUPPLIES AND SERVICES AREAS

OCCUPATIONAL OPPORTUNITIES IN AGRICULTURAL SUPPLIES AND SERVICES

HUMAN RELATIONS IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS

DEVELOPING LEADERSHIP THROUGH FFA

AGRICULTURAL SUPPLY AND SERVICE BUSINESS ORGANIZATIONS

AGRICULTURAL SUPPLY AND SERVICE SALESMANSHIP AND SELLING

AGRICULTURAL SUPPLY AND SERVICE BUSINESS PROCEDURES AND RECORDS

OPERATION AND CARE OF SMALL GASOLINE ENGINES

MAINTENANCE OF SMALL GASOLINE ENGINES

REPLACING AND MAINTAINING PULLEYS, V-BELTS AND FLAT BELTS

OCCUPATIONAL OPPORTUNITIES IN AGRICULTURAL SUPPLIES AND SERVICES

UNIT CONCEPT: THE FIELD OF AGRICULTURAL SUPPLIES AND SERVICES INCLUDES A BROAD SPECTRUM OF CAREER OPPORTUNITIES THE STUDENT MAY WISH TO EXPLORE. BY STUDYING THE VARIOUS OCCUPATIONS, THE STUDENT IS ABLE TO CONSIDER VARIOUS FACTORS SUCH AS WORKING CONDITIONS, SALARY AND REQUIREMENTS FOR ENTRY THAT WILL ASSIST HIM IN MAKING CAREER DECISIONS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. IN SEEKING INFORMATION ABOUT JOB OPPORTUNITIES, SURVEY OR OBTAIN LITERATURE INFORMATION WHICH WILL ASSIST HIM IN DETERMINING THE NUMBER AND KIND OF JOB OPPORTUNITIES THAT ARE AVAILABLE IN AGRICULTURAL SUPPLIES AND SERVICES.
2. WHEN GIVEN A SPECIFIC JOB IN WHICH THE STUDENT IS INTERESTED, DETERMINE THE COMPETENCIES AND REQUIREMENTS NEEDED BY PERSONS TO ENTER AND ADVANCE IN AGRICULTURAL SUPPLIES AND SERVICES CAREERS.
3. UPON DETERMINING THE REQUIREMENTS AND COMPETENCIES NEEDED TO ENTER A JOB, DEVELOP A PERSONAL PLAN WHICH WILL AID HIM IN ACQUIRING THE COMPETENCIES AND MEETING THE REQUIREMENTS NEEDED FOR ENTRY IN THAT JOB.
4. UPON IDENTIFYING A JOB IN WHICH HE IS INTERESTED, FOLLOW THE PROPER PROCEDURES NECESSARY TO BECOME PLACED ON THE JOB.
5. UPON SECURING PLACEMENT ON A JOB, WORK WITH OTHER EMPLOYEES, THE EMPLOYER AND THE PUBLIC IN A MANNER THAT WILL ENABLE THE STUDENT TO SUCCEED ON THE JOB.

B. INSTRUCTIONAL AREAS

1. ASSESSING THE JOB OPPORTUNITIES AVAILABLE IN AGRICULTURAL SUPPLIES AND SERVICES
 - A. LOCATING INFORMATION REGARDING THE SCOPE OF AGRICULTURAL SUPPLIES OCCUPATIONS AND THE OPPORTUNITIES FOR EMPLOYMENT

- B. SURVEYING THE LOCAL REGION FOR ENTRY LEVEL JOBS REGARDING THE NUMBER OF OPENINGS PER YEAR AND FUTURE EMPLOYMENT NEEDS
- 2. MAKING A DETAILED STUDY OF SELECTED AGRICULTURAL SUPPLIES AND SERVICES OCCUPATIONS
 - A. DETERMINING WHAT PERSONAL INTERESTS ARE AND HOW THEY RELATE TO A SPECIFIC JOB OR CLUSTER OF OCCUPATIONS
 - B. ASSESSING THE COMPETENCIES THAT ARE NEEDED FOR ENTRY
 - C. DETERMINING THE EDUCATIONAL REQUIREMENTS NECESSARY FOR EMPLOYMENT
 - D. ASSESSING THE PERSONAL TRAITS REQUIRED BY THE OCCUPATION
 - E. DETERMINING THE WORKER'S FRINGE BENEFITS IN A GIVEN OCCUPATION
 - F. CONSIDERING FEDERAL REGULATIONS WHICH APPLY TO VARIOUS OCCUPATIONS
- 3. DEVELOPING A PERSONAL PLAN FOR GAINING EXPERIENCES NECESSARY FOR GAINFUL EMPLOYMENT IN A GIVEN OCCUPATIONAL AREA
 - A. PLANNING ACTIVITIES THAT WILL ENABLE THE STUDENT TO BE EXPOSED TO EXPERIENCES WHICH WILL AID IN HIS EMPLOYMENT
 - B. WORKING WITH COOPERATORS IN DEVELOPING THE OCCUPATIONAL EXPERIENCE PROGRAM
 - C. RECORDING THE ACTIVITIES IN THE OCCUPATIONAL EXPERIENCE PROGRAM
 - D. SUPERVISING AND EVALUATING THE STUDENT'S OCCUPATIONAL EXPERIENCE PROGRAM
- 4. SECURING A JOB BY FOLLOWING THE PROPER PROCEDURES INVOLVED IN JOB PLACEMENT
 - A. LOCATING POTENTIAL JOBS THROUGH VARIOUS SOURCES
 - B. ASSESSING THE JOB DESCRIPTION AND THE STUDENT'S INTERESTS
 - C. APPLYING FOR A JOB

- (1) WRITING A LETTER OF APPLICATION
- (2) PREPARING A RESUME
- (3) SECURING REFERENCES

D. CONDUCTING THE PERSONAL INTERVIEW

- 5. CONSIDERING FACTORS IMPORTANT TO JOB SUCCESS AND ADVANCEMENT
 - A. ESTABLISHING RAPPORT WITH FELLOW EMPLOYEES, THE PUBLIC AND THE EMPLOYER
 - B. PERSONAL GROOMING AND ITS IMPACT UPON THE PUBLIC, THE EMPLOYER AND FELLOW EMPLOYEES
 - C. FOLLOWING DIRECTIONS AND WORKING INDEPENDENTLY IN AN OCCUPATION
 - D. DEVELOPING DESIRABLE WORK HABITS
 - E. CONTINUING SELF-IMPROVEMENT ON THE JOB

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. CONDUCT A PERSONAL SURVEY BY PERSONAL CONTACT OR QUESTIONNAIRE OF REGIONAL AGRICULTURAL SUPPLY AND SERVICE FIRMS TO DETERMINE THE NUMBER OF PERSONNEL EMPLOYED IN VARIOUS JOBS IN AGRICULTURAL SUPPLIES AND SERVICES AND THE NUMBER OF OPENINGS EACH YEAR.
- 2. INTERVIEW SEVERAL PERSONS IN SPECIFIC OCCUPATIONS AND DETERMINE THE COMPETENCIES AND REQUIREMENTS NEEDED TO ENTER THE OCCUPATIONS.
- 3. A. WRITE A LETTER OF APPLICATION AND FILL OUT AN APPLICATION FORM. HAVE THE CLASS MEMBERS CRITIQUE THE APPLICATION FORMS COMPLETED.
 B. VISIT THE MANAGERS OF AGRICULTURAL SUPPLY AND SERVICE FIRMS AND DISCUSS WITH THEM THE FACTORS THEY CONSIDER IN HIRING EMPLOYEES.
- 4. USING SIMULATION TECHNIQUES, HAVE THE STUDENTS ROLE PLAY JOB INTERVIEWS. RECORD THE INTERVIEWS ON A TAPE RECORDER AND HAVE EACH STUDENT CRITIQUE HIS OWN PRESENTATION. TO GUIDE THE STUDENTS IN THE CRITIQUE, HAVE THE CLASS DEVELOP A LIST OF CRITERIA FOR JOB INTERVIEWS AND CHECK THEMSELVES AGAINST THESE CRITERIA.
- 5. USING A PANEL COMPOSED OF EMPLOYERS AND EMPLOYEES, HAVE THE CLASS DISCUSS WITH THEM THE DEVELOPMENT AND

MAINTENANCE OF WORKING RELATIONSHIPS BETWEEN EMPLOYEES
AND EMPLOYER.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. A. DEVELOP A MATCHING EXERCISE FOR THE STUDENTS TO COMPLETE. ONE OF THE COLUMNS COULD BE VARIOUS JOB TITLES FOUND IN AGRICULTURAL SUPPLY AND SERVICE FIRMS AND THE SECOND COLUMN COULD BE BRIEF JOB DESCRIPTIONS.

B. HAVE THE STUDENTS LIST THREE SOURCES OR PERSONS THEY MAY CONSULT OR CONTACT TO OBTAIN INFORMATION REGARDING JOB OPENINGS IN AGRICULTURAL SUPPLY AND SERVICE FIRMS.
2. THE STUDENT WILL COMPLETE A SURVEY OF A GIVEN OCCUPATION OR CLUSTER OF OCCUPATIONS TO THE SATISFACTION OF THE TEACHER WHICH ASSESSES THE COMPETENCIES NEEDED FOR EMPLOYMENT, THE EDUCATIONAL REQUIREMENTS FOR GAINING EMPLOYMENT, AND THE PERSONAL CHARACTERISTICS NEEDED FOR SUCCESSFUL EMPLOYMENT IN AGRICULTURAL SUPPLIES AND SERVICES.
3. HAVE EACH STUDENT COMPLETE A PERSONAL PLAN FOR OBTAINING EMPLOYMENT IN HIS DESIRED OCCUPATION WHICH SHOULD INCLUDE THE NECESSARY EDUCATIONAL AND WORK EXPERIENCES IN ADDITION TO ANY SPECIAL COMPETENCIES THAT NEED TO BE ACQUIRED.
4. A. GIVE EACH STUDENT A LETTER OF APPLICATION TO CRITIQUE. THIS LETTER OF APPLICATION SHOULD CONTAIN BOTH "GOOD" AND "BAD" PROCEDURES AND TECHNIQUES FOR PREPARING A LETTER OF APPLICATION. HAVE EACH STUDENT WRITE ON A SHEET OF PAPER THE "IMPROPER" PROCEDURES OR TECHNIQUES FOLLOWED IN THE LETTER OF APPLICATION AND INDICATE HOW HE WOULD CHANGE THE LETTER OF APPLICATION WERE HE TO SUBMIT IT TO AN EMPLOYER.

B. USING A VIDEO TAPE MACHINE, PLAY BACK TO THE STUDENTS A JOB INTERVIEW THAT A LOCAL EMPLOYER HAS CONDUCTED WITH A POTENTIAL EMPLOYEE. (TWO TEACHERS IN THE SCHOOL SYSTEM MAY BE USED TO SIMULATE THE JOB INTERVIEW.) HAVE THE STUDENTS LIST ON A PIECE OF PAPER THE "GOOD" AND "BAD" POINTS THEY OBSERVED IN THE INTERVIEW.
5. USING A CASE STUDY IN WHICH AN EMPLOYEE IS NOT "GETTING ALONG" WITH HIS FELLOW EMPLOYEES, THE CUSTOMERS AND HIS EMPLOYER, HAVE THE STUDENTS INDICATE WHAT PROCEDURES OR

ACTIVITIES THE EMPLOYEE SHOULD FOLLOW IN ORDER TO RE-ESTABLISH GOOD WORKING RELATIONSHIPS WITH THE CUSTOMERS, EMPLOYEES AND EMPLOYER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SAMPLES OF JOB APPLICATION FORMS, LETTERS OF APPLICATION, OCCUPATIONAL SURVEY FORMS, PERSONAL CHARACTERISTICS CHECK LISTS, AND COPIES OF STATE AND FEDERAL LABOR REGULATIONS
2. APPROPRIATE TABLES, DESKS, CHAIRS AND TAPE RECORDER OR VIDEO TAPE MACHINES NECESSARY FOR CONDUCTING SIMULATED JOB INTERVIEWS
3. WRITTEN NOTICES FROM NEWSPAPERS, JOURNALS AND OTHER PUBLICATIONS LISTING VARIOUS JOB OPENINGS

F. EXAMPLES OF SUPPORTING REFERENCES

1. BINKLEY, HAROLD AND HAMMONDS, CARLIE. EXPERIENCE PROGRAMS FOR LEARNING VOCATIONS IN AGRICULTURE. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1970, 604 PAGES.

THIS PUBLICATION PRESENTS AN OVERVIEW OF THE EXPERIENCE PROGRAM AND THE OPPORTUNITIES IN AGRICULTURAL SUPPLIES AND SERVICES THAT STUDENTS WILL FIND RELATIVELY EASY TO UNDERSTAND.

2. OPPORTUNITIES IN AGRICULTURAL OCCUPATIONS AND THE EMPLOYEE WITHIN THE BUSINESS ORGANIZATION. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 68 PAGES.

A STUDENT MANUAL, THIS REFERENCE MAY BE HELPFUL WHEN COVERING SUCH TOPICS AS APPLYING FOR A JOB, ASSESSING ONE'S PERSONAL CHARACTERISTICS, AND LOCATING JOB OPPORTUNITIES.

3. RESOURCE UNIT ON CAREER OPPORTUNITIES FOR CORE CURRICULUM. TUCSON, ARIZONA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE UNIVERSITY OF ARIZONA. 1970, 10 PAGES.

DEVELOPED IN AN OUTLINE FORMAT, THIS REFERENCE WILL BE HELPFUL TO THE INSTRUCTOR IN DEVELOPING QUESTIONS AND PROBLEMS FOR DISCUSSION. INCLUDED IS A LIST OF FILM-STRIPS AND STUDENT ACTIVITIES FOR EXPLORING AGRICULTURAL OCCUPATIONS.

4. RESOURCE UNIT ON SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS FOR CORE CURRICULUM. TUCSON, ARIZONA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE UNIVERSITY OF ARIZONA. 1970, 35 PAGES.

ESPECIALLY USEFUL AS A TEACHER'S REFERENCE, THIS PUBLICATION COVERS IN DETAIL THE VARIOUS TYPES OF SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAMS. INCLUDED IN THE PUBLICATION ARE CONCEPTS TO BE TAUGHT, UNIT OBJECTIVES, TEACHING AIDS AND SUGGESTED STUDENT ACTIVITIES.

HUMAN RELATIONS IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS

UNIT CONCEPT: MANY JOBS ARE LOST BECAUSE OF POOR HUMAN RELATIONS BETWEEN EMPLOYEE, CUSTOMER, EMPLOYER AND SUPERVISOR. HUMAN RELATIONS IN TODAY'S SOCIETY IS A "TWO-WAY STREET" AS THE EMPLOYEE HAS A ROLE OF RESPONSIBILITY AND LOYALTY TO THE EMPLOYER AND THE EMPLOYER HAS CERTAIN RESPONSIBILITIES TO THE EMPLOYEE. THE HUMAN RELATIONS PROCESS FOCUSES UPON THE ABILITY TO PRESENT IDEAS AND THE ABILITY TO LISTEN AS PEOPLE RELATE TO EACH OTHER.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. IDENTIFY SOME OF THE MAJOR CAUSES OF FAILURE ON THE JOB AND IDENTIFY SOME OF THE CRITERIA EMPLOYERS USE IN ADVANCING OR PROMOTING PERSONS SUCH AS DEPENDABILITY, PUNCTUALITY, PRODUCTION, INITIATIVE, COOPERATION, APPEARANCE AND COMPETENCE.
2. IN PREPARING FOR AN OCCUPATION IN AGRICULTURAL SUPPLIES AND SERVICES, COMPLETE A SELF-EVALUATION OF HIS PHYSICAL APPEARANCE, SPEECH AND CONVERSATION AND HIS PERSONALITY AS IT PERTAINS TO RELATIONS WITH OTHER PERSONS TO THE SATISFACTION OF THE TEACHER.
3. IN PREPARING TO ENTER INTO AN OCCUPATION IN AGRICULTURAL SUPPLIES AND SERVICES, IDENTIFY THE EMPLOYEE'S ROLE, THE EMPLOYER'S ROLE, THE SUPERVISOR'S ROLE AND THE CUSTOMER'S ROLE IN THE BUSINESS TO THE SATISFACTION OF THE TEACHER.
4. WHEN WORKING WITH EMPLOYERS, FELLOW EMPLOYEES, SUPERVISORS OR CUSTOMERS, COMMUNICATE EFFECTIVELY ORALLY OR IN WRITING WITH THESE PEOPLE TO THE SATISFACTION OF THE TEACHER AND/OR EMPLOYER.
5. WHILE EMPLOYED IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS, PROPERLY ANSWER AND USE THE TELEPHONE TO CONDUCT BUSINESS TRANSACTIONS TO THE SATISFACTION OF THE TEACHER AND/OR EMPLOYER.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHY PEOPLE FAIL AND SUCCEED ON THE JOB
 - A. IDENTIFYING COMMON CAUSES OF JOB FAILURE
 - (1) CAUSES RELATED TO GENERAL HUMAN RELATIONS SKILLS
 - (2) CAUSES RELATED TO TECHNICAL COMPETENCE
 - B. IDENTIFYING THE VARIOUS HUMAN NEEDS AND MOTIVES THAT ARE SATISFIED BY OCCUPATIONS
 - C. RECOGNIZING HOW THESE HUMAN MOTIVES AND NEEDS AFFECT THE HUMAN RELATIONS PROCESS
2. IDENTIFYING VARIOUS HUMAN RELATIONS SITUATIONS IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS
 - A. ASSESSING THE EMPLOYEE'S ROLE IN THE BUSINESS
 - (1) DETERMINING THE EMPLOYEE'S RESPONSIBILITY TO THE EMPLOYER, FELLOW EMPLOYEES AND SUPERVISOR
 - (2) DETERMINING THE EMPLOYEE'S RESPONSIBILITY TO THE CUSTOMERS
 - B. ASSESSING THE EMPLOYER'S ROLE IN THE BUSINESS
 - (1) DETERMINING THE EMPLOYER'S RESPONSIBILITY TO THE EMPLOYEES
 - (2) DETERMINING THE EMPLOYER'S RESPONSIBILITY TO THE FIRM'S CUSTOMERS
 - C. ASSESSING THE SUPERVISOR'S ROLE IN THE BUSINESS
 - (1) DETERMINING THE SUPERVISOR'S RESPONSIBILITY TO HIS EMPLOYER
 - (2) DETERMINING THE SUPERVISOR'S RESPONSIBILITY TO THE EMPLOYEES
 - (3) DETERMINING THE SUPERVISOR'S RESPONSIBILITY TO THE CUSTOMER
 - D. ASSESSING THE CUSTOMER'S ROLE IN THE BUSINESS
3. CONSIDERING FACTORS THAT INFLUENCE THE HUMAN RELATIONS PROCESS IN AGRICULTURAL SUPPLIES AND SERVICES
 - A. ASSESSING THE INFLUENCE OF PERSONALITY IN HUMAN RELATIONS
 - (1) CONSIDERING FACTORS THAT INFLUENCE PERSONALITY
 - (2) CONTROLLING AND IMPROVING THE PERSONALITY

B. RELATING TO FELLOW EMPLOYEES

- (1) FEELINGS AND ATTITUDES THAT INFLUENCE PERSONALITY
- (2) COOPERATING WITH FELLOW EMPLOYEES TO CREATE A PRODUCTIVE AND PLEASANT WORK ENVIRONMENT

C. RELATING TO SUPERVISORS

- (1) IMPROVING ATTITUDES TOWARD SUPERVISION AND ACCEPTING CRITICISM, ADVICE AND PRAISE
- (2) COOPERATING WITH SUPERVISORS IN RECOGNIZING AND SOLVING PROBLEMS THAT AFFECT THE BUSINESS ORGANIZATION

D. RELATING TO THE FIRM'S CUSTOMERS

- (1) RECOGNIZING AND SOLVING PROBLEMS IN CUSTOMER RELATIONS
- (2) FOSTERING THE DEVELOPMENT OF GOOD HUMAN RELATIONS WITH CUSTOMERS

4. COMMUNICATING WITH CUSTOMERS AND PERSONNEL IN THE BUSINESS

A. USING THE TELEPHONE EFFECTIVELY

- (1) ANSWERING THE TELEPHONE
- (2) TAKING TELEPHONE MESSAGES
- (3) USING THE TELEPHONE AS A SALES TOOL

B. COMMUNICATING THROUGH WRITTEN MEDIA

- (1) WRITING LETTERS TO CUSTOMERS
- (2) TRANSMITTING MESSAGES THROUGH OFFICE MEMOS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. HAVE THE STUDENTS CONDUCT A QUESTIONNAIRE SURVEY OF LOCAL AGRICULTURAL SUPPLY AND SERVICE BUSINESSES AND DETERMINE THE MAJOR FACTORS OR REASONS FOR PERSONS LOSING THEIR JOBS DURING THE PAST FIVE YEARS.
- 2. HAVE EACH STUDENT COMPLETE A SELF-INVENTORY OF HIS PERSONALITY AND COMPARE HIS RATINGS WITH THE RATINGS COMPLETED BY OTHERS.
- 3. HAVE A PERSONNEL MANAGER, A MANAGER OR A SUPERVISOR FROM AN AGRICULTURAL SUPPLY AND SERVICE BUSINESS VISIT THE CLASS. HAVE THE STUDENTS AND GUEST DISCUSS THE

IMPORTANCE OF ESTABLISHING GOOD HUMAN RELATIONS WITH THE EMPLOYER, FELLOW EMPLOYEE, CUSTOMER AND SUPERVISOR. ADDITIONALLY, HAVE THE STUDENTS AND GUEST DISCUSS THE ROLE AND RESPONSIBILITY OF THE VARIOUS PERSONNEL WITHIN THE ORGANIZATION.

4. IN A CLASSROOM SIMULATION, HAVE THE STUDENT RECEIVE A MESSAGE OVER THE TELEPHONE FROM A CUSTOMER AND THEN RELAY THE MESSAGE TO ONE OF THE PERSONNEL BY USING AN OFFICE MEMO.
5. USING A TELEPHONE AND RECORDER, HAVE THE STUDENT RECORD A TELEPHONE CONVERSATION OF HIMSELF AND COMPLETE A SELF-RATING VOICE SCALE.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. HAVE THE STUDENTS LIST SOME OF THE MAJOR REASONS WHY EMPLOYEES LOSE THEIR JOBS SUCH AS LACK OF DEPENDABILITY, POOR PHYSICAL APPEARANCE, LACK OF COMPETENCE, LACK OF PUNCTUALITY AND OTHER REASONS.
2. HAVE EACH STUDENT COMPLETE A SELF-INVENTORY OF HIS PHYSICAL APPEARANCE, SPEECH AND CONVERSATION AND PERSONALITY USING THE FORM, "INVENTORY OF YOUR PERSONALITY," AS DESCRIBED IN RESOURCE UNIT ON HUMAN RELATIONS. (TUCSON, ARIZONA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE UNIVERSITY OF ARIZONA, 1971.)
3. HAVE THE STUDENTS COMPLETE A MULTIPLE CHOICE AND TRUE OR FALSE EXERCISE WHICH FOCUSES ON THE ROLES AND RESPONSIBILITIES OF THE VARIOUS PERSONNEL IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS.
4. PRESENT THE STUDENTS WITH A CASE PROBLEM, A PART OF WHICH REPRESENTS A MEMO THAT AN EMPLOYEE TRANSMITTED TO THE EMPLOYER OR SUPERVISOR. HAVE THE STUDENTS CRITIQUE THE MEMO FOR SPELLING, PUNCTUATION, BREVITY AND CLARITY OF THOUGHT. HAVE THE STUDENTS INDICATE IN WRITING ANY CHANGES IN THE MEMO THAT THEY WOULD MAKE.
5. HAVE THE STUDENTS LIST SOME OF THE "DO'S" AND "DON'TS" THAT NEED TO BE OBSERVED AND FOLLOWED WHEN USING THE TELEPHONE IN A BUSINESS.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. APPROPRIATE CLASSROOM EQUIPMENT SUCH AS TAPE RECORDER, TELEPHONE AND VIDEO TAPE EQUIPMENT

2. APPROPRIATE FORMS FOR SELF-EVALUATION SUCH AS INVENTORING SHEETS FOR PERSONALITY, PHYSICAL CHARACTERISTICS AND CASE PROBLEMS

F. EXAMPLES OF SUPPORTING REFERENCES

1. COURSE OF STUDY IN AGRICULTURAL OCCUPATIONS. LEXINGTON, KENTUCKY: DEPARTMENT OF AGRICULTURAL EDUCATION, UNIVERSITY OF KENTUCKY. 1967, PP. 65-90.

THIS REFERENCE, WHICH IS MOST HELPFUL TO TEACHERS, COVERS IN OUTLINE FORM THE VARIOUS AREAS OF HUMAN RELATIONS. VARIOUS FORMS ARE PROVIDED WHICH MAY BE COMPLETED IN EVALUATING THE HUMAN RELATIONS ASPECTS SUCH AS HUMAN RELATIONS WITH FELLOW WORKERS AND AN EMPLOYER-TEACHER EVALUATION.

2. EDUCATION FOR AGRIBUSINESS OCCUPATIONS: A GUIDE TO SECONDARY SCHOOL COURSE PLANNING AND TEACHING. URBANA, ILLINOIS: AGRICULTURAL EDUCATION DIVISION, UNIVERSITY OF ILLINOIS. 1971, 59 PAGES.

ESPECIALLY USEFUL TO THE TEACHER, THIS REFERENCE PRESENTS A MODULE ON HUMAN RELATIONS WHICH IDENTIFIES THE COMPETENCIES TO BE DEVELOPED, SUGGESTED LEARNING ACTIVITIES, AND RECOMMENDED AND SUPPLEMENTARY REFERENCES. HELPFUL SECTIONS OF THE HUMAN RELATIONS MODULE INCLUDE UNDERSTANDING THE IMPORTANCE OF PERSONAL APPEARANCE, ADVANCING IN AN AGRIBUSINESS, DEVELOPING DESIRABLE EMPLOYEE CHARACTERISTICS, BECOMING AN EFFICIENT EMPLOYEE, HANDLING PROBLEMS ON THE JOB, GETTING ALONG WITH CO-WORKERS, GETTING ALONG WITH THE BOSS, AND MAINTAINING PROPER RELATIONS WITH CUSTOMERS AND COMPETITORS.

3. HUMAN RELATIONS IN AGRI-BUSINESS. EAST LANSING, MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY. 1969, 64 PAGES.

THIS PUBLICATION IS INTENDED TO BE USED AS A STUDENT MANUAL FOR INDIVIDUALIZED INSTRUCTION. INCLUDED IS A BRIEF TEXT ON VARIOUS TOPICS IN HUMAN RELATIONS FOLLOWED BY STUDENT ACTIVITIES OR EXERCISES TO EVALUATE THE STUDENT'S COMPREHENSION OF THE TOPIC DISCUSSED.

4. HUMAN RELATIONS IN AGRICULTURAL OCCUPATIONS. MODULE NO. 3. COLUMBUS, OHIO: THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, THE OHIO STATE UNIVERSITY. 1965, 31 PAGES.

A TEACHER GUIDE, THIS PUBLICATION CONTAINS SUBJECT MATTER CONTENT FOR THE TEACHER WITH APPROPRIATE SUGGESTED

LEARNING ACTIVITIES AND A MEANS OF EVALUATING STUDENT PERFORMANCE. VARIOUS CASES ARE PRESENTED WHICH THE TEACHER MAY WISH TO USE WITH STUDENTS ON VARIOUS ASPECTS OF HUMAN RELATIONS.

5. HUMAN RELATIONS IN BUSINESS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 69 PAGES.

THIS STUDENT REFERENCE INCLUDES BRIEF YET COMPREHENSIVE DISCUSSIONS AND EXERCISES, INCLUDING CASES WHICH THE STUDENT CAN READ AND COMPLETE TO OBTAIN A BETTER UNDERSTANDING OF THE HUMAN RELATIONS PROCESS.

6. RESOURCE UNIT ON HUMAN RELATIONS. TUCSON, ARIZONA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE UNIVERSITY OF ARIZONA. 1971, 90 PAGES.

IN THIS REFERENCE FOR TEACHERS, THE COMPLETE AREA OF HUMAN RELATIONS IS COVERED IN OUTLINE FORM. NUMEROUS CASE PROBLEMS ARE PRESENTED FOR STUDENTS AND TEACHERS TO CONSIDER DURING DISCUSSION PERIODS. VARIOUS RATING FORMS FOR SELF-EVALUATION ARE INCLUDED WHICH THE STUDENTS MAY COMPLETE. SAMPLE TEST ITEMS ARE ALSO INCLUDED.

DEVELOPING LEADERSHIP THROUGH FFA

UNIT CONCEPT: ACTIVE PARTICIPATION IN THE FFA WILL PROVIDE THE STUDENT OPPORTUNITIES FOR DEVELOPING PRACTICAL TRAINING IN AGRICULTURE, LEADERSHIP, CO-OPERATION AND CITIZENSHIP.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. USING THE BASIC PRINCIPLES OF LEADERSHIP, IDENTIFY THE ROLE OF THE FFA ORGANIZATION IN AGRICULTURAL SUPPLIES AND SERVICES EDUCATION.
2. USING THE OFFICIAL FFA MANUAL, IDENTIFY THE HISTORY, AIMS AND PURPOSES AND ORGANIZATION OF THE FFA ON THE LOCAL, STATE AND NATIONAL LEVELS.
3. BY ACTIVELY PARTICIPATING IN THE ORGANIZATION'S BUSINESS MEETING, DEMONSTRATE THE PRINCIPLES OR PARLIAMENTARY PROCEDURE AS PRESENTED IN ROBERT'S RULES OF ORDER OR OTHER ACCEPTABLE REFERENCES.
4. THROUGH ACTIVE PARTICIPATION IN THE ORGANIZATION, SERVE EFFECTIVELY AS A COMMITTEE MEMBER AND/OR CHAIRMAN IN PLANNING AND CARRYING OUT THE CHAPTER PROGRAM OF ACTIVITIES.
5. IF ELECTED, SERVE EFFECTIVELY AS AN OFFICER IN THE ORGANIZATION BY FULFILLING THE DUTIES OF THE OFFICE TO WHICH ELECTED.
6. THROUGH CHAPTER AND CLASSROOM ACTIVITIES, DEVELOP EFFECTIVE PUBLIC SPEAKING SKILLS SO AS TO BE ABLE TO MAKE INTRODUCTIONS, PARTICIPATE IN CONVERSATIONS AND PREPARE AND DELIVER SPEECHES AND TALKS.
7. THROUGH ACTIVE PARTICIPATION IN THE FFA, DEVELOP A STRONG SELF CONCEPT AND A POSITIVE ATTITUDE TOWARD WORKING IN SOCIETY AS EVIDENCED BY HIS PUBLIC AND PRIVATE ACTIVITIES.

B. INSTRUCTIONAL AREAS

1. DEVELOPING LEADERSHIP

A. PURPOSES FOR ATTAINING LEADERSHIP SKILLS

- B. TYPES OF LEADERSHIP
 - (1) FORMAL LEADERSHIP
 - (2) INFORMAL LEADERSHIP
- C. QUALITIES OF LEADERSHIP
- D. STYLES OF LEADERSHIP
- E. FUNCTIONS OF DEMOCRATIC LEADERSHIP
- F. OPPORTUNITIES FOR DEVELOPING LEADERSHIP ABILITIES
 - (1) HOME
 - (2) SCHOOL
 - (3) COMMUNITY
 - (4) FFA
- 2. DETERMINING THE PLACE OF FFA IN AGRICULTURAL SUPPLIES AND SERVICES EDUCATION
 - A. THE VALUES OF FFA MEMBERSHIP
 - B. THE CONTRIBUTION OF THE FFA TO THE SCHOOL AND COMMUNITY
- 3. DETERMINING THE BACKGROUND OF THE FFA
 - A. IMPORTANT HISTORICAL FACTS
 - B. AIMS AND PURPOSES
 - C. COLORS, EMBLEM, MOTTO AND CREED
- 4. GOVERNING AND FINANCING THE FFA
 - A. IDENTIFYING LOCAL, STATE AND NATIONAL PROCEDURES
- 5. ATTAINING FFA MEMBERSHIP AND DEGREES
 - A. TYPES OF MEMBERSHIP
 - B. LOCAL, STATE AND NATIONAL DEGREES
- 6. PLANNING AND CONDUCTING A CHAPTER MEETING
 - A. IDENTIFYING OFFICER RESPONSIBILITIES
 - B. IDENTIFYING MEMBER RESPONSIBILITIES
 - C. CONDUCTING THE BUSINESS MEETING

7. PLANNING AND CONDUCTING THE CHAPTER PROGRAM OF ACTIVITIES
 - A. IDENTIFYING AREAS TO BE INCLUDED
 - B. DEVELOPING A PROGRAM OF ACTIVITIES
 - C. CARRYING OUT THE PROGRAM OF ACTIVITIES
 - (1) IDENTIFYING CHAIRMAN RESPONSIBILITIES
 - (2) IDENTIFYING COMMITTEE MEMBER RESPONSIBILITIES
8. PERFORMING FFA OFFICER DUTIES AND RESPONSIBILITIES
 - A. IDENTIFYING QUALIFICATIONS FOR LOCAL, STATE AND NATIONAL OFFICES
 - B. IDENTIFYING SPECIFIC DUTIES OF EACH OFFICER
 - C. DETERMINING GENERAL RESPONSIBILITIES OF AN OFFICER
 - (1) CONDUCTING CHAPTER PROGRAM
 - (2) PARTICIPATING IN OFFICER MEETINGS
 - (3) PARTICIPATING IN LEADERSHIP ACTIVITIES
 - (4) CONDUCTING CHAPTER MEETINGS
9. DEVELOPING PROFICIENCY IN PARLIAMENTARY PROCEDURE
 - A. PRESIDING OVER MEETINGS
 - B. PRESENTING MOTIONS CORRECTLY
10. DEVELOPING PUBLIC SPEAKING SKILLS
 - A. DEVELOPING CONVERSATION SKILLS
 - B. MAKING INTRODUCTIONS
 - C. PREPARING A SPEECH OR TALK
 - D. DELIVERING A SPEECH OR TALK
11. DETERMINING RESPONSIBILITIES OF FFA MEMBERS
 - A. DEVELOPING PERSONAL ATTRIBUTES
 - (1) PERSONAL APPEARANCE
 - (2) PROPER MANNERS
 - (3) BEHAVIOR IN PUBLIC
 - B. USING THE FFA CODE OF ETHICS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. ANALYZE THE QUALITIES OF RECOGNIZED GOOD LEADERS.
2. ATTEND STATE AND/OR NATIONAL FFA CONVENTIONS TO OBSERVE THE OPERATION OF THE ORGANIZATION.
3. A. PARTICIPATE IN CLASSROOM STUDY AND PRACTICE OF PARLIAMENTARY PROCEDURE TO DEVELOP PARLIAMENTARY PROCEDURE SKILLS.

B. PLAN AND POST AGENDA IN ADVANCE OR REGULAR CHAPTER MEETINGS TO PROMOTE ATTENDANCE AND PARTICIPATION BY ALL MEMBERS.

C. ATTEND AND PARTICIPATE IN FFA MEETINGS TO DEVELOP LEADERSHIP ABILITIES.

D. PREPARE FOR AND PARTICIPATE IN PARLIAMENTARY PROCEDURE DEMONSTRATIONS AND CONTESTS.
4. A. ACCEPT AN FFA COMMITTEE ASSIGNMENT SUITED TO INTEREST AND ABILITY TO DEVELOP SKILLS IN COMMITTEE WORK.

B. SERVE AS A COMMITTEE CHAIRMAN TO DEVELOP LEADERSHIP SKILLS.

C. PREPARE WRITTEN AND ORAL COMMITTEE REPORTS AND PRESENT THEM AT FFA MEETINGS TO DEVELOP PERSONAL SKILLS AND TO FACILITATE OPERATION OF THE ORGANIZATION.

D. PARTICIPATE IN SPECIAL TRAINING PROGRAMS FOR COMMITTEE CHAIRMEN TO OBTAIN SKILLS IN COMMITTEE WORK.
5. A. ARRANGE FOR ELECTION OF FFA OFFICERS AND PARTICIPATE AS AN OFFICER IF ELECTED.

B. PLAN, CONDUCT AND/OR PARTICIPATE IN LEADERSHIP WORKSHOPS OR OFFICER-TRAINING PROGRAMS.

C. ESTABLISH PERFORMANCE STANDARDS FOR LOCAL FFA OFFICERS.
6. A. PARTICIPATE IN CLASSROOM DISCUSSIONS, DEMONSTRATIONS, ORAL AND WRITTEN REPORTS, AND LOCAL PUBLIC SPEAKING COMPETITION.

B. ENTER PUBLIC SPEAKING CONTESTS ABOVE THE LOCAL LEVEL.

C. PARTICIPATE IN LEADERSHIP ACTIVITIES ABOVE THE LOCAL LEVEL.

- D. PRACTICE MAKING FORMAL INTRODUCTIONS THROUGH ROLE PLAYING.
- E. HAVE EACH STUDENT PREPARE A SHORT TALK OR SPEECH TO PRESENT IN CLASS, USING A TAPE RECORDER OR VIDEO-TAPE FOR THE STUDENT TO HEAR AND/OR OBSERVE HIS PERFORMANCE.
- F. PREPARE AND/OR PARTICIPATE IN RADIO AND T.V. PROGRAMS RELATING TO FFA ACTIVITIES.
- 7. CONDUCT A SELF-EVALUATION OF LEADERSHIP QUALITIES, PERSONALITY CHARACTERISTICS, AND OTHER PERSONAL ATTRIBUTES, IDENTIFYING STRONG POINTS TO BUILD UPON AND WEAK POINTS NEEDING IMPROVEMENT.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

- 1. HAVE EACH STUDENT LIST THE QUALITIES OF A DEMOCRATIC LEADER SO THAT ATTAINMENT OF THE QUALITIES WOULD RESULT IN A PERSON DISPLAYING DEMOCRATIC LEADERSHIP.
- 2. DEVELOP A MATCHING TEST IN WHICH EACH STUDENT WOULD MATCH THE PARTS OF THE FFA EMBLEM WITH WHAT IT SYMBOLIZES WITH COMPLETE ACCURACY.
- 3. DIVIDE THE CLASS INTO GROUPS TO PRESENT A BUSINESS MEETING. THE TEACHER SHOULD EVALUATE EACH GROUP AND MEMBER AS TO THEIR POISE AND KNOWLEDGE OF PARLIAMENTARY PROCEDURE.
- 4. HAVE EACH MEMBER ASSIGNED RESPONSIBILITIES FOR ASSISTING IN PLANNING AND CONDUCTING THE CHAPTER PROGRAM OR ACTIVITIES. EVALUATE EACH MEMBER IN REFERENCE TO COMPLETION OF HIS ASSIGNED TASKS AND THE IMPROVEMENT THAT HE EXHIBITS OVER EACH GRADING PERIOD.
- 5. HAVE THE SECRETARY, TREASURER, AND REPORTER REGULARLY SUBMIT THEIR BOOKS TO THE AUDITING COMMITTEE AND TEACHER FOR EVALUATION AS TO COMPLETENESS, NEATNESS, AND ACCURACY.
- 6. CONDUCT A PUBLIC SPEAKING CONTEST IN EACH CLASS FOR THE TEACHER TO EVALUATE EACH STUDENT FOR HIS PRESENTATION IN RELATION TO HIS SPEAKING ABILITIES.
- 7. HAVE EACH STUDENT COMPLETE A PERSONAL EVALUATION FORM AS TO HIS ATTITUDES TOWARD HIMSELF AND SOCIETY. THE TEACHER SHOULD PRIVATELY DISCUSS THE PERSONAL EVALUATION WITH EACH STUDENT TO RECOGNIZE STRONG POINTS AND WEAK POINTS NEEDING IMPROVEMENT.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. OFFICIAL FFA PARAPHERNALIA
2. OFFICIAL FFA SECRETARY'S AND TREASURER'S BOOKS
3. OFFICIAL FFA SCRAPBOOK
4. TAPE RECORDER OR VIDEO-TAPE

F. EXAMPLES OF SUPPORTING REFERENCES

1. BENDER, RALPH E. THE FFA AND YOU. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1962, 494 PAGES.

THIS TEXT COVERS ALL AREAS OF FFA PROGRAM ACTIVITIES AS WELL AS OFFICER AND MEMBER DUTIES AND RESPONSIBILITIES.

2. NEWCOMB, L.H. MEMBERSHIP - THE PATHWAY TO LEADERSHIP. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 12 PAGES.

AN AID FOR TEACHER UNIT PLANNING AND FOR THE STUDENT, THIS BOOKLET EMPHASIZES FUNDAMENTAL LEADERSHIP COMPETENCIES TO BE DEVELOPED BY ALL MEMBERS.

3. OFFICIAL MANUAL, FUTURE FARMERS OF AMERICA. ALEXANDRIA, VIRGINIA: FUTURE FARMERS SUPPLY SERVICE. 1972, 128 PAGES.

THIS MANUAL WILL ASSIST BOTH MEMBERS AND ADVISORS IN GAINING AN UNDERSTANDING OF THE HISTORY, ORGANIZATION, AND OPERATION OF THE FFA.

4. STEWART, W.F. HELPS IN MASTERING PARLIAMENTARY PROCEDURE. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1969, 27 PAGES.

A SIMPLE AND EASILY UNDERSTOOD BOOKLET CONTAINING THE BASIC RULES OF PARLIAMENTARY PROCEDURE; IT ALSO INCLUDES A QUICK REFERENCE CHART WITH REQUIREMENTS FOR EACH TYPE OF MOTION.

AGRICULTURAL SUPPLY AND SERVICE BUSINESS ORGANIZATIONS

UNIT CONCEPT: THE SUCCESSFUL OPERATION OF THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS REQUIRES THE INPUT OF NATURAL RESOURCES, LABOR, CAPITAL AND MANAGEMENT. THE EMPLOYEE WHO IS AWARE OF HOW THESE INPUTS ARE COMBINED AND HOW THE AGRICULTURAL BUSINESS IF ORGANIZED WILL BE A VITAL LINK IN THE PRODUCTION, DISTRIBUTION AND SALE OF AGRICULTURAL SUPPLIES AND SERVICES TO SATISFIED CUSTOMERS WHO WILL CONTINUE TO PATRONIZE THE BUSINESS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PRESENTED WITH A LIST OF AGRICULTURAL SUPPLY AND SERVICE FIRMS, LIST OR DESCRIBE FIVE CONTRIBUTIONS THOSE FIRMS MAKE TO THE LOCAL COMMUNITY.
2. WHEN PRESENTED WITH INFORMATION REGARDING AGRICULTURAL SUPPLY AND SERVICE FIRMS, LIST OR DESCRIBE TEN ACTIVITIES OR SERVICES PERFORMED BY THE AGRICULTURAL SUPPLY AND SERVICE FIRMS FOR THE CUSTOMER.
3. WHEN PRESENTED WITH INFORMATION REGARDING AGRICULTURAL SUPPLY AND SERVICE FIRMS, CHART THE OWNERSHIP ORGANIZATION AND LIST THREE ADVANTAGES AND THREE DISADVANTAGES OF THE DIFFERENT TYPES OF OWNERSHIP.
4. WHEN PRESENTED WITH INFORMATION RELATING TO THE ORGANIZATIONAL STRUCTURE, CHART THE ORGANIZATIONAL STRUCTURE AND LIST THREE ADVANTAGES AND THREE DISADVANTAGES OF THE DIFFERENT TYPES OF ORGANIZATIONAL STRUCTURE.
5. WHEN PRESENTED WITH INFORMATION REGARDING THE RISKS INVOLVED IN THE OPERATION OF THE BUSINESS, LIST FOUR MAJOR RISK AREAS AND DESCRIBE HOW THE AGRICULTURAL SUPPLY AND SERVICE FIRM HANDLES THESE RISK AREAS TO THE SATISFACTION OF THE TEACHER.

B. INSTRUCTIONAL AREAS

1. DETERMINING HOW THE AGRICULTURAL SUPPLY AND SERVICE FIRM CONTRIBUTES TO THE LOCAL COMMUNITY

- A. MATERIALS SUPPLIED TO THE LOCAL COMMUNITY
 - B. SERVICES OFFERED TO THE LOCAL COMMUNITY
 - C. INFORMATION AVAILABLE TO THE LOCAL COMMUNITY REGARDING AGRICULTURAL PRODUCTS AND TECHNIQUES
 - D. JOBS AVAILABLE FOR LOCAL EMPLOYEES AND DETERMINING HOW THIS AFFECTS THE LOCAL ECONOMY
 - E. TAXES PAID BY THE LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRMS AND HOW TAXES SUPPORT LOCAL AGENCIES
 - F. PUBLIC RELATIONS AND SUPPORT ACTIVITIES ENGAGED IN BY LOCAL AGRICULTURAL SUPPLY AND SERVICE BUSINESSES
2. DETERMINING THE VARIOUS FACTORS THAT ARE NEEDED TO MAKE AN AGRICULTURAL SUPPLY AND SERVICE FIRM PRODUCTIVE
 - A. LABOR AS AN INPUT INTO THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - B. CAPITAL AS AN INPUT INTO THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - C. MANAGEMENT AS AN INPUT INTO THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - D. NATURAL RESOURCES AS INPUTS INTO THE AGRICULTURAL SUPPLY AND SERVICE FIRM
3. DETERMINING THE FUNCTIONS OF AGRICULTURAL SUPPLY AND SERVICE FIRMS
 - A. THE EXCHANGE FUNCTIONS
 - (1) PURCHASING
 - (2) SELLING
 - B. THE PHYSICAL FUNCTIONS
 - (1) TRANSPORTING
 - (2) STORING
 - (3) PROCESSING AND PACKAGING
 - C. THE FACILITATING FUNCTIONS
 - (1) STANDARDIZING, SORTING, GRADING
 - (2) FINANCING AND EXTENDING CREDIT
 - (3) RISK-TAKING
 - (4) PROVIDING MARKET INFORMATION AND RESEARCH INFORMATION

4. IDENTIFYING THE VARIOUS TYPES OF AGRICULTURAL SUPPLY AND SERVICE BUSINESS OWNERSHIP
 - A. THE INDIVIDUALLY-OWNED AGRICULTURAL SUPPLY AND SERVICE BUSINESS
 - (1) DETERMINING THE MANAGEMENT AND OWNERSHIP RESPONSIBILITIES
 - (2) DETERMINING THE FINANCIAL AND RISK RESPONSIBILITIES AND HOW RISKS ARE COVERED
 - (3) ADVANTAGES AND DISADVANTAGES OF INDIVIDUALLY-OWNED AGRICULTURAL SUPPLY AND SERVICE BUSINESSES
 - B. THE PARTNERSHIP
 - (1) DETERMINING THE MANAGEMENT AND OWNERSHIP RESPONSIBILITIES
 - (2) DETERMINING THE FINANCIAL AND RISK RESPONSIBILITIES
 - (3) ADVANTAGES AND DISADVANTAGES OF PARTNERSHIPS
 - C. THE GENERAL BUSINESS TYPE OF AGRICULTURAL SUPPLY AND SERVICE CORPORATION
 - (1) DETERMINING THE MANAGEMENT AND OWNERSHIP RESPONSIBILITIES
 - (2) DETERMINING THE FINANCIAL AND RISK RESPONSIBILITIES
 - (3) ADVANTAGES AND DISADVANTAGES OF GENERAL BUSINESS TYPE CORPORATIONS
 - D. THE COOPERATIVELY-OWNED AGRICULTURAL SUPPLY AND SERVICE BUSINESS
 - (1) DETERMINING THE MANAGEMENT AND OWNERSHIP RESPONSIBILITIES
 - (2) DETERMINING THE FINANCIAL AND RISK RESPONSIBILITIES
 - (3) ADVANTAGES AND DISADVANTAGES OF COOPERATIVES
5. DETERMINING THE ORGANIZATIONAL PATTERN OR STRUCTURE OF AGRICULTURAL SUPPLY AND SERVICE BUSINESSES
 - A. IDENTIFYING, COMPARING AND CONTRASTING THE VARIOUS TYPES OF ORGANIZATIONAL PATTERNS USED IN SMALL AND LARGE BUSINESSES
 - (1) THE WHEEL PATTERN
 - (2) THE LINE OR MILITARY PATTERN
 - (3) THE LINE AND STAFF PATTERN

B. IDENTIFYING THE VARIOUS DIVISIONS OF PERSONNEL RESPONSIBILITY

- (1) MANAGEMENT
- (2) SUPERVISORY
- (3) WORKERS

C. IDENTIFYING THE OPERATIONAL AREAS WITHIN THE BUSINESS

- (1) MANAGEMENT
- (2) ACCOUNTING
- (3) OPERATIONS
- (4) PRODUCT DEPARTMENTS

6. INTERPRETING THE VARIOUS GOVERNMENTAL REGULATIONS AND LAWS THAT PERTAIN TO AGRICULTURAL SUPPLY AND SERVICE BUSINESSES

- A. GOVERNMENTAL AGENCIES THAT PROVIDE ASSISTANCE TO SMALL BUSINESSES
- B. IDENTIFYING AND INTERPRETING THE VARIOUS LAWS AND REGULATIONS THAT PERTAIN TO THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. A. HAVE THE STUDENTS TALK WITH VARIOUS PERSONS IN THE LOCAL COMMUNITY AND DEVELOP A LIST OF CONTRIBUTIONS WHICH THE CITIZENS BELIEVE THE AGRICULTURAL SUPPLY AND SERVICE FIRMS MAKE TO THE COMMUNITY.
- B. HAVE THE STUDENTS SURVEY A LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRM TO DETERMINE THE VARIOUS CONTRIBUTIONS THAT FIRM MAKES TO THE COMMUNITY. THE STUDENTS MAY DESIRE TO COLLECT INFORMATION SUCH AS THE NUMBER OF PERSONS EMPLOYED BY THE FIRM, THE AVERAGE WAGES AND TOTAL WAGES PAID TO VARIOUS PERSONS AND THE ESTIMATED LOCAL TAXES.
- 2. HAVE THE STUDENTS DEVELOP A LIST OF AGRICULTURAL SUPPLY AND SERVICE FIRMS IN THE LOCAL COMMUNITY. FOR EACH OF THE FIRMS, HAVE THE STUDENTS DEVELOP A LIST OF THE ACTIVITIES OR SERVICES THE FIRMS PROVIDE FOR THE LOCAL FARMER.
- 3. DIVIDE THE STUDENTS INTO FOUR TEAMS AND HAVE THEM DEVELOP CLASS PRESENTATIONS FOR EACH OF THE FOUR TYPES OF OWNERSHIP. THESE PRESENTATIONS SHOULD COVER SUCH AREAS AS WHO IS RESPONSIBLE FOR THE MANAGEMENT DECISIONS, WHO

PROVIDES THE CAPITAL, HOW RISKS ARE COVERED, AND THE ADVANTAGES AND DISADVANTAGES OF THE VARIOUS TYPES OF OWNERSHIP.

4. HAVE THE STUDENTS SURVEY SEVERAL LOCAL AGRICULTURAL SUPPLY AND SERVICE BUSINESSES AND CHART THE ORGANIZATIONAL STRUCTURE FOUND IN THOSE BUSINESSES.
5. HAVE THE STUDENTS VISIT WITH A LOCAL AGRICULTURAL SUPPLY AND SERVICE PROPRIETOR AND DISCUSS WITH HIM HOW HIS FIRM COVERS THE VARIOUS RISKS SUCH AS RISKS INVOLVED IN TRADING, RISKS INVOLVING DAMAGE TO PROPERTY, RISKS WITH EMPLOYEES AND THE PUBLIC, RISKS FROM POLITICAL FORCES, RISKS OF DISHONEST EMPLOYEES AND RISKS OF BAD DEBTS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. DEVELOP A COMPLETION EXERCISE FOR THE STUDENTS. PRESENT THE STUDENTS WITH A LIST OF THREE LOCAL AGRICULTURAL SUPPLY AND SERVICE BUSINESSES AND HAVE THE STUDENTS LIST FIVE CONTRIBUTIONS THESE FIRMS MAKE TO THE LOCAL COMMUNITY.
2. HAVE THE STUDENTS LIST TEN SERVICES PERFORMED FOR CUSTOMERS BY LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRMS.
3. A. DEVELOP A TRUE OR FALSE EXERCISE FOR THE STUDENTS TO COMPLETE WHICH COVERS THE VARIOUS TYPES OF BUSINESS OWNERSHIP. INCLUDED IN THIS TRUE OR FALSE EXERCISE SHOULD BE TOPIC AREAS FOR THE VARIOUS AREAS OF OWNERSHIP SUCH AS WHO OWNS THE BUSINESS, WHO VOTES, HOW THE VOTING IS DONE, WHO DETERMINES THE POLICIES, WHO PROVIDES THE CAPITAL, AND WHO RECEIVES THE OPERATING PROFITS. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.

B. HAVE THE STUDENTS COMPARE AND CONTRAST THE VARIOUS TYPES OF BUSINESS OWNERSHIP BY LISTING THREE ADVANTAGES AND THREE DISADVANTAGES FOR EACH TYPE OF OWNERSHIP.
4. PRESENT THE STUDENTS WITH VARIOUS SKETCHES OF BUSINESS ORGANIZATIONAL PATTERNS. HAVE THE STUDENTS CORRECTLY IDENTIFY EACH SKETCH WITH THE PROPER ORGANIZATIONAL PATTERN NAME AND LIST THREE ADVANTAGES AND THREE DISADVANTAGES OF EACH ORGANIZATIONAL PATTERN.
5. PRESENT THE STUDENTS WITH A CASE STUDY FOR A SPECIFIC AGRICULTURAL SUPPLY AND SERVICE BUSINESS WHICH DESCRIBES THE VARIOUS TYPES OF RISK AREAS FOR THE BUSINESS. HAVE THE STUDENTS DESCRIBE THE COMMON PROCEDURES OR POLICIES USED BY SIMILAR BUSINESSES TO HANDLE OR COVER SUCH

RISKS. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE INSTRUCTOR.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. CHARTS AND TRANSPARENCIES WHICH SHOW THE ORGANIZATIONAL PATTERNS OF AGRICULTURAL SUPPLY AND SERVICE FIRMS
2. MOVIES ON COOPERATIVES AVAILABLE THROUGH THE LOCAL PRODUCTION CREDIT ASSOCIATION OFFICE
3. COPIES OF LAWS AND REGULATIONS PERTAINING TO THE AGRICULTURAL SUPPLY AND SERVICE FIRM AVAILABLE FROM THE BETTER BUSINESS BUREAU AND FROM STATE GRAIN, FEED AND FERTILIZER ASSOCIATIONS

F. EXAMPLES OF SUPPORTING REFERENCES

1. CLARK, RAYMOND AND OEN, URBAN. ORGANIZATION AND FUNCTIONS OF AGRICULTURAL BUSINESS. EAST LANSING, MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY. 1969, 19 PAGES.

INTENDED TO BE USED AS A STUDENT MANUAL FOR INDIVIDUALIZED INSTRUCTION, THIS MANUAL COVERS SUCH TOPIC AREAS AS THE IMPORTANCE OF A BUSINESS TO THE COMMUNITY, FUNCTIONS IN AN AGRICULTURAL BUSINESS, THE TYPES OF AGRICULTURAL SUPPLY BUSINESSES, AND THE ORGANIZATIONAL PATTERNS OF AGRICULTURAL SUPPLY AND SERVICE BUSINESSES.

2. COOPERATION IN A FREE ENTERPRISE SOCIETY. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1973, 206 PAGES.

PERHAPS MORE DETAILED THAN IS NEEDED FOR SOME STUDENTS, THIS STUDENT MANUAL COVERS UNITS SUCH AS HOW COOPERATIVES ARE ORGANIZED, WHAT ARE COOPERATIVE MEMBERS' RESPONSIBILITIES, THE MANAGER'S ROLE AND RESPONSIBILITY IN A SUCCESSFUL COOPERATIVE, THE LEGAL BASIS FOR COOPERATIVES, AND DISCOVERING PROBLEMS IN COOPERATIVE OPERATIONS.

3. RESOURCE UNIT ON ORGANIZATION OF AGRICULTURE BUSINESSES. TUCSON, ARIZONA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE UNIVERSITY OF ARIZONA. 1971, 31 PAGES.

AN EXCELLENT REFERENCE FOR USE BY TEACHERS, THIS PUBLICATION PROVIDES CONCEPTS TO BE TAUGHT, UNIT OBJECTIVES, REFERENCES, TEACHING AIDS, AND STUDENT ACTIVITIES FOR AREAS SUCH AS ORGANIZATIONAL PATTERNS OF BUSINESSES,

THE FUNCTIONS OF AND SERVICES PROVIDED BY AGRICULTURAL BUSINESSES, AND THE VARIOUS TYPES OF BUSINESS OWNERSHIP.

4. SELLAND, LARRY, INTRODUCTION TO - AGRIBUSINESS MANAGEMENT. FARGO, NORTH DAKOTA: DEPARTMENT OF AGRICULTURAL EDUCATION, NORTH DAKOTA VOCATIONAL AGRICULTURE ASSOCIATION. 1969, 74 PAGES.

THIS REFERENCE INCLUDES AN EXCELLENT UNIT ON THE ORGANIZATION OF AGRICULTURAL BUSINESSES WHICH TEACHERS MAY FIND HELPFUL. INCLUDED ARE WORKSHEETS COVERING TOPICS SUCH AS LEARNING ABOUT BUSINESS ORGANIZATIONS IN THE COMMUNITY, A COMPARISON OF THE MAJOR TYPES OF BUSINESS OWNERSHIP, AND ADVANTAGES AND DISADVANTAGES OF DIFFERENT TYPES OF ORGANIZATIONAL PATTERNS.

5. STEVENS, GLENN Z. AND BURNS, PAUL M. A PLAN TO REDUCE CERTAIN CREDIT AND COLLECTION PROBLEMS RELATED TO AGRICULTURAL SUPPLIES SALES AND SERVICE BUSINESSES. UNIVERSITY PARK, PENNSYLVANIA: DEPARTMENT OF AGRICULTURAL EDUCATION, THE PENNSYLVANIA STATE UNIVERSITY. 1968, 29 PAGES.

THIS PUBLICATION COVERS IN A CONCISE MANNER THE RATIONALE FOR EXTENDING CREDIT TO CUSTOMERS OF THE AGRICULTURAL SUPPLY AND SERVICE FIRM AND VARIOUS PROCEDURES AND POLICIES FIRMS HAVE FOR COLLECTING MONEY FROM CUSTOMERS.

AGRICULTURAL SUPPLIES AND SERVICES SALESMANSHIP AND SELLING

UNIT CONCEPT: EFFECTIVE SELLING IN TODAY'S COMPLEX SOCIETY PROVIDES THE CORNERSTONE TO THE SUCCESS OF AN AGRICULTURAL SUPPLY AND SERVICE FIRM WHETHER IT INVOLVES THE SELLING OF PRODUCTS AND/OR SERVICES. ALL EMPLOYEES WHO ARE SKILLED IN THE ART OF SALESMANSHIP AND FOCUS THEIR ATTENTION ON THE NEEDS OF THE CUSTOMER CAN AID IN THE DEVELOPMENT OF A SATISFIED CUSTOMER AND IN THE BUILDING OF "REPEAT BUSINESS" WHICH WILL AID IN THE MAXIMIZATION OF PROFITS FOR THE AGRICULTURAL SUPPLY AND SERVICE FIRM.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHILE WORKING IN THE AGRICULTURAL SUPPLY AND SERVICE SALES DEPARTMENT, HANDLE THE OBJECTIONS AND COMPLAINTS OF A CUSTOMER TO THE SATISFACTION OF THE TEACHER, EMPLOYER AND CUSTOMER.
2. WHILE WORKING IN THE SALES DEPARTMENT OF AN AGRICULTURAL SUPPLY AND SERVICE FIRM, ADVERTISE AND DISPLAY ITEMS FOR SALE IN A MANNER ACCEPTABLE TO THE TEACHER AND/OR EMPLOYER.
3. WHILE WORKING IN THE SALES DEPARTMENT OF AN AGRICULTURAL SUPPLY AND SERVICE FIRM, MEET PROSPECTIVE CUSTOMERS AND CONDUCT A SALES PRESENTATION TO THE SATISFACTION OF THE TEACHER AND/OR EMPLOYER.

B. INSTRUCTIONAL AREAS

1. DETERMINING THE DUTIES AND RESPONSIBILITIES OF SALES PERSONNEL IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM

A. SELLING DUTIES AND RESPONSIBILITIES SUCH AS:

- (1) WAITING ON CUSTOMERS PROMPTLY
- (2) GIVING SERVICE TO CUSTOMERS
- (3) DEVELOPING REPEAT BUSINESS FOR THE AGRICULTURAL SUPPLY AND SERVICE FIRM
- (4) HANDLING THE STORE SYSTEMS EFFICIENTLY
- (5) BECOMING AWARE OF THE FIRM'S SELLING POLICIES

(6) OTHERS

B. NONSELLING DUTIES AND RESPONSIBILITIES SUCH AS:

- (1) CHANGING DISPLAYS
- (2) TAKING INVENTORY
- (3) KEEPING RECORDS
- (4) DIRECTING CUSTOMERS
- (5) KEEPING THE SALES AREA NEAT AND ORDERLY
- (6) OTHERS

C. DETERMINING THE INFLUENCE THE NONSALES PERSONNEL IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM HAVE ON THE SALES OF THE BUSINESS

2. ASSESSING THE ATTRIBUTES OF SUCCESSFUL SALES PERSONNEL

A. DETERMINING THE INFLUENCE PERSONALITY HAS ON THE SALES PROCESS

B. DETERMINING THE INFLUENCE THE SALESMAN'S MENTAL ATTITUDE HAS ON SELLING

C. ASSESSING THE IMPORTANCE A SALESMAN'S PHYSICAL APPEARANCE HAS ON SELLING

D. DETERMINING THE IMPORTANCE OF PRODUCT KNOWLEDGE IN THE SELLING PROCESS

3. DISPLAYING MERCHANDISE FOR SALE

A. DETERMINING THE GENERAL OBJECTIVES OF DISPLAYING MERCHANDISE FOR SALE

B. DETERMINING THE ELEMENTS OF EFFECTIVE DISPLAYS

- (1) BALANCE AS IT RELATES TO DISPLAYS
- (2) COLOR IN THE DISPLAY
- (3) THE IMPORTANCE OF SIMPLICITY IN THE DISPLAY
- (4) OTHER ELEMENTS OF AN EFFECTIVE DISPLAY

C. IDENTIFYING THE VARIOUS TYPES OF DISPLAYS USED TO PROMOTE SALES

D. CONSTRUCTING AND DEVELOPING EFFECTIVE DISPLAYS

- (1) MATERIALS TO USE IN CONSTRUCTING EFFECTIVE DISPLAYS
- (2) DEVELOPING EFFECTIVE DISPLAYS FOR SPECIFIED PRODUCTS

- E. MAINTAINING EFFECTIVE DISPLAYS
 - (1) CHANGING DISPLAY ARRANGEMENTS
 - (2) RESTOCKING THE SUPPLIES IN THE DISPLAYS
- 4. ADVERTISING THE FIRMS PRODUCTS THROUGH ADVERTISING ANNOUNCEMENTS
 - A. DETERMINING THE GENERAL OBJECTIVES OF ADVERTISING
 - B. DETERMINING THE ELEMENTS OF EFFECTIVE ADVERTISEMENTS
 - C. IDENTIFYING VARIOUS MEDIA TO BE UTILIZED IN ADVERTISING PROGRAMS
 - D. CONSTRUCTING AND DEVELOPING EFFECTIVE ADVERTISING PROGRAMS FOR THE AGRICULTURAL SUPPLY AND SERVICE FIRM
- 5. UNDERSTANDING THE AGRICULTURAL SUPPLY AND SERVICE FIRM CUSTOMER
 - A. DETERMINING WHAT THE CUSTOMER'S BUYING MOTIVES OR BUYING DECISIONS ARE
 - (1) THE NEED
 - (2) THE PRODUCT
 - (3) THE SOURCE OF THE PRODUCT
 - (4) THE TIME
 - (5) THE PRICE
 - B. DETERMINING HOW THE KNOWLEDGE OF SUCH MOTIVES ARE USEFUL IN MAKING SALES PRESENTATIONS TO THE CUSTOMER
 - C. RECOGNIZING AND EFFECTIVELY HANDLING THE VARIOUS TYPES OF CUSTOMERS
 - (1) SELLING PRODUCTS TO THE COMMON-SENSE CUSTOMER
 - (2) SELLING PRODUCTS TO THE DEPENDENT CUSTOMER
 - (3) SELLING PRODUCTS TO THE CHALLENGING CUSTOMER
 - (4) SELLING PRODUCTS TO SPECIAL CASE CUSTOMERS SUCH AS THE CASUAL LOOKER AND THE UNDECIDED CUSTOMER
- 6. MAKING THE SALES PRESENTATION
 - A. PRE-APPROACH - GETTING READY TO MEET THE CUSTOMER
 - (1) OBTAINING INFORMATION ABOUT THE CUSTOMER
 - (2) OBTAINING INFORMATION ABOUT THE MERCHANDISE
 - (3) CHECKING THE SALESMAN'S PERSONAL APPEARANCE

B. GREETING THE CUSTOMER

- (1) PROPERLY MEETING THE CUSTOMER
- (2) MAKING AN IMPORTANT FIRST IMPRESSION

C. GAINING AND MAINTAINING CUSTOMER ATTENTION AND INTEREST

- (1) GETTING THE CUSTOMER'S ATTENTION
- (2) GETTING THE CUSTOMER'S POINT OF VIEW
- (3) DEVELOPING METHODS TO DIRECT THE CUSTOMER'S INTERESTS
- (4) MAINTAINING THE CUSTOMER'S INTEREST

D. HANDLING THE CUSTOMER'S OBJECTIONS

- (1) IDENTIFYING THE CUSTOMER'S OBJECTIONS SUCH AS OBJECTIONS TO PRICE, ERRONEOUS IDEAS ABOUT THE PRODUCT, LACK OF A DESIRE TO CHANGE, TIME AND SOURCE
- (2) DETERMINING HOW TO HANDLE THESE OBJECTIONS AND STILL KEEP THE CUSTOMER INTERESTED
- (3) SELLING SUBSTITUTE ITEMS AND/OR RELATED ITEMS

E. CLOSING THE SALE

- (1) DETERMINING WHEN TO CLOSE THE SALE
- (2) USING VARIOUS TECHNIQUES FOR CLOSING THE SALE
- (3) FILLING THE SALES ORDER AND PACKAGING THE ITEMS SOLD WHEN NECESSARY
- (4) RECORDING THE SALE AND COMPLETING THE APPROPRIATE FORMS USED BY THE BUSINESS
- (5) FOLLOWING UP THE SALE

F. HANDLING CUSTOMER COMPLAINTS AFTER THE SALE HAS BEEN COMPLETED

- (1) DETERMINING WHAT THE COMPLAINT IS AND THE SOURCE OR CAUSE OF THE COMPLAINT
- (2) FOLLOWING APPROPRIATE PROCEDURES FOR HANDLING THE COMPLAINT OR REFERRING THE CUSTOMER TO APPROPRIATE PERSONNEL TO HANDLE THE COMPLAINT

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. A. USING STUDENTS IN A ROLE PLAYING SITUATION, HAVE THE STUDENTS PRACTICE HANDLING CUSTOMER COMPLAINTS WHICH WOULD NORMALLY BE BROUGHT INTO A PERSON WORKING IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM.

- B. USING A VIDEO TAPE MACHINE, HAVE THE STUDENTS VIEW A TYPICAL COMPLAINT WHICH WOULD CONFRONT A SALES PERSON IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM. PLAY THE VIDEO TAPE FOR THE STUDENTS UP TO THE POINT WHERE THE SALES PERSON HANDLES THE CUSTOMER'S COMPLAINT. AFTER THE STUDENTS HAVE DISCUSSED THE WAY IN WHICH THEY WOULD HANDLE THE COMPLAINT, CONTINUE PLAYING THE VIDEO TAPE AND OBSERVE HOW THE SALES PERSON IN THE INDUSTRY HANDLED THE COMPLAINT.
2. A. USING VARIOUS PRODUCTS AND A DISPLAY COUNTER, HAVE THE STUDENTS SET UP A DISPLAY WHICH COULD BE USED IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM.
- B. HAVE THE STUDENTS PREPARE A SAMPLE DIRECT MAIL ADVERTISING FLYER THAT COULD BE USED BY THE SALES DEPARTMENT IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM.
3. A. USING STUDENTS, SAMPLE PRODUCTS AND A DISPLAY COUNTER, ROLE PLAY THE COMPLETE SALES PROCESS FOCUSING UPON GREETING THE CUSTOMER, MAINTAINING INTEREST AND OVERCOMING CUSTOMER OBJECTIONS. HAVE THE STUDENTS DISCUSS THE VARIOUS PRESENTATIONS.
- B. USING SIMULATION PROCEDURES AND A DISPLAY COUNTER AND VARIOUS PRODUCTS, HAVE THE STUDENTS DEMONSTRATE THE USE OF SUBSTITUTE SELLING AND RELATED SALES ITEMS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH A CASE STUDY EITHER WRITTEN ON PAPER OR PRESENTED ON VIDEO TAPE. HAVE THE STUDENTS WRITE OR VERBALLY EXPLAIN THE PROCEDURES THEY WOULD FOLLOW TO HANDLE THE CUSTOMER'S COMPLAINT. EVALUATE THE STUDENTS' RESPONSES BY CONSIDERING THE DEGREE TO WHICH THE CUSTOMER'S COMPLAINT IS HANDLED IN AN EFFICIENT MANNER, WHETHER IT IS LOGICAL AND WHETHER IT FOLLOWS PROCEDURES USED BY LOCAL FIRMS.
2. PRESENT THE STUDENTS WITH A PICTURE OR SKETCH OF A DISPLAY AREA. HAVE THE STUDENTS INDICATE WHAT CHANGES THEY WOULD MAKE IF THEY WERE REDESIGNING THE DISPLAY AND SKETCH THEIR PROPOSED DISPLAY. EVALUATE THE STUDENTS' COMMENTS AND SKETCHES CONSIDERING SUCH FACTORS AS EYE APPEAL OF THE DISPLAY, BALANCE, AND SIMPLICITY.
3. WHILE THE STUDENTS ARE EMPLOYED IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM, EVALUATE THE STUDENTS' TECHNIQUES AND PROCEDURES FOR MAKING SALES. EVALUATE THE

STUDENTS' WORK BY CONSIDERING SUCH FACTORS AS PREPARING FOR THE SALE, OBTAINING THE CUSTOMER'S ATTENTION, GREETING THE CUSTOMER, MAINTAINING THE CUSTOMER'S INTEREST, OVERCOMING ANY CUSTOMER COMPLAINTS AND CLOSING THE SALE.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. APPROPRIATE EQUIPMENT NEEDED FOR SIMULATION OF THE SALES PROCESS SUCH AS SALES FORMS, CASH REGISTER AND DISPLAY COUNTER
2. APPROPRIATE EXAMPLES OF AGRICULTURAL PRODUCTS SOLD IN AGRICULTURAL SUPPLY AND SERVICE FIRMS SUCH AS VARIOUS CHEMICALS IN VARIOUS SIZED CONTAINERS, SEEDS, LUBRICANTS, AND OTHERS
3. ACCESS TO COOPERATIVE WORK EXPERIENCE TRAINING STATIONS
4. VIDEO TAPE EQUIPMENT
5. PERSONALITY EVALUATION FORMS

F. EXAMPLES OF SUPPORTING REFERENCES

1. ADVERTISING AND PROMOTION. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 34 PAGES.

A STUDENT REFERENCE AND WORKBOOK, THIS REFERENCE SPECIFICALLY FOCUSES UPON THE PREPARATION OF ADVERTISING FOR VARIOUS MEDIA AND THE PREPARATION OF DISPLAYS. VARIOUS STUDENT ASSIGNMENTS AND EXERCISES ARE INCLUDED.
2. AGRICULTURAL SALESMANSHIP: COURSE OUTLINE FOR AGRICULTURAL SUPPLY - SALES AND SERVICE OCCUPATIONS. COLUMBUS, OHIO: THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, THE OHIO STATE UNIVERSITY. 1965, 19 PAGES.

A TEACHER OUTLINE, THIS REFERENCE COVERS THE SECTIONS ON MEETING THE CUSTOMER, PRESENTING SUPPLIES AND SERVICES TO THE CUSTOMER, OVERCOMING CUSTOMER RESISTANCE AND CLOSING THE SALE. INCLUDED IN THE OUTLINE ARE SUGGESTED TEACHING-LEARNING ACTIVITIES.
3. SALESMANSHIP IN AGRICULTURAL BUSINESS. VAS 6001. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 1972, 24 PAGES.

THIS REFERENCE WHICH IS USEFUL TO STUDENTS PRESENTS AN OVERVIEW OF THE OPPORTUNITIES IN SALES IN AGRICULTURAL BUSINESS AND THE IMPORTANCE OF SELLING IN OUR ECONOMY. SECTIONS COVERED IN THE REFERENCE DEAL WITH THE PERSONAL CHARACTERISTICS OF SALES PERSONNEL, CONDUCTING THE SALES INTERVIEW, HANDLING OBJECTIONS AND CLOSING THE SALE.

4. SELLING AND SALESMANSHIP. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 32 PAGES.

A STUDENT REFERENCE AND WORKBOOK, THIS REFERENCE COVERS THE AREAS OF SUCCESSFUL SELLING, THE ACTUAL SALES TRANSACTION AND THE LOST SALE. INCLUDED THROUGHOUT ARE EXERCISES WHICH THE STUDENT MAY COMPLETE.

5. WILLS, WALTER J. AN INTRODUCTION TO AGRIBUSINESS MANAGEMENT. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1973, PP. 93-103.

INCLUDED IN THIS REFERENCE IS A CHAPTER WHICH FOCUSES ON THE AREA OF SALES MANAGEMENT. INCLUDED ARE SECTIONS ON NON-PRICE COMPETITION, FARMER-DEALER COMPETITION, APPEARANCE, PRICE AND WORKING WITH THE CUSTOMER.

AGRICULTURAL SUPPLY AND SERVICE BUSINESS PROCEDURES AND RECORDS

UNIT CONCEPT: LIKE ANY INSURANCE POLICY THAT PROTECTS THE BUSINESS FROM FIRES AND OTHER HAZARDS, SO A GOOD BUSINESS ACCOUNTING SYSTEM SUPPLEMENTED WITH SOUND PROCEDURES AND PRACTICES MAY ASSIST IN PROTECTING THE OWNER'S INVESTMENT FROM THE HAZARDS OF MISMANAGEMENT. A PERSON WHO IS AWARE OF THE PRACTICES AND PROCEDURES TO MINIMIZE THE COSTS OF MISMANAGEMENT AND INCREASE THE PROFITS ACCRUING TO THE BUSINESS MAY ASSIST THE OWNER IN PROVIDING EFFICIENT AND EFFECTIVE SERVICE TO THE AGRICULTURAL SUPPLY AND SERVICE FIRM'S CUSTOMERS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. UPON MAKING A SALE, CORRECTLY WRITE UP A SALES TICKET AND CALCULATE THE TOTAL AMOUNT OF THE SALE AFTER CONSIDERING AND CALCULATING DISCOUNTS, SERVICE CHARGES, AND SALES TAX WHERE APPLICABLE.
2. WHEN PRESENTED A COMPLETED SALES TICKET AND PAYMENT IN EITHER THE FORM OF CURRENCY OR CHECK, CORRECTLY OPERATE THE CASH REGISTER AND MAKE CHANGE FOR THE CUSTOMER.
3. USING THE APPROPRIATE INVENTORY FORMS USED BY THE AGRICULTURAL SUPPLY AND SERVICE FIRM, CORRECTLY MAINTAIN A PERPETUAL INVENTORY AND TAKE A PHYSICAL INVENTORY AT THE END OF THE YEAR.
4. USING THE APPROPRIATE PURCHASE ORDER FORMS AND RECEIVING RECORDS USED BY THE FIRM, CORRECTLY WRITE UP THE PURCHASE ORDER FOR INVENTORY ITEMS AND COMPLETE THE RECEIVING RECORDS.
5. USING THE AGRICULTURAL SUPPLY AND SERVICE FIRM'S DESIGNATED SCHEDULE FOR PRODUCT PERCENTAGE MARK-UP ON COST AND FURNISHED WITH A GIVEN COST, CORRECTLY ESTABLISH THE SELLING PRICE FOR THE PRODUCT OR PRODUCTS.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHY IT IS IMPORTANT TO MAINTAIN ACCURATE AND COMPLETE RECORDS AND FOLLOW APPROPRIATE BUSINESS

PROCEDURES IN THE AGRICULTURAL SUPPLY AND SERVICE BUSINESS.

- A. IMPORTANCE OF GOOD RECORDS
 - B. IMPORTANCE OF FOLLOWING PROPER BUSINESS PROCEDURES IN CONDUCTING THE TRANSACTIONS OF THE BUSINESS
 - C. VARIOUS TYPES OF RECORDS AND PROCEDURES USED IN THE LOCAL AGRICULTURAL BUSINESS SUCH AS:
 - (1) SALES RECORDS AND TICKETS
 - (2) ACCOUNTS RECEIVABLE AND ACCOUNTS PAYABLE RECORDS AND FORMS USED IN THE BUSINESS
 - (3) PURCHASE ORDERS USED IN THE BUSINESS
 - (4) INVENTORY RECORDS USED IN THE BUSINESS
 - (5) SALES TAX RECORDS AND FORMS
 - (6) DISCOUNTS AND PRICES
 - D. FILING THE VARIOUS FORMS USED IN THE BUSINESS
2. PREPARING THE SALES TICKET
- A. OBTAINING THE APPROPRIATE INFORMATION THAT IS NEEDED TO COMPLETE THE SALES TICKET AND ENTERING THE INFORMATION ON THE SALES TICKET
 - B. CALCULATING CASH DISCOUNTS, QUANTITY DISCOUNTS, BULK DISCOUNTS AND EARLY SEASON DISCOUNTS TO DETERMINE COSTS
 - C. CALCULATING CHARGES FOR SUPPLEMENTAL SERVICES PERFORMED SUCH AS DRYING, SHELLING, GRINDING OR DELIVERING
 - D. DETERMINING THE AMOUNT OF TAX TO BE CHARGED
 - E. FILING THE SALES TICKET
3. RECEIVING PAYMENTS FOR SALES
- A. USING THE CASH REGISTER FOR RINGING UP SALES
 - B. RECEIVING CASH PAYMENTS FOR SALES
 - C. RECEIVING CHECK PAYMENTS FOR SALES
 - D. MAKING CHANGE FOR CUSTOMERS
 - E. PROBLEMS IN MAKING CHANGE SUCH AS EXTRA PAYMENT TRANSACTIONS

- F. SECURING A SUPPLY OF CHANGE
- G. CORRECTING FOR ERRORS IN MAKING CHANGE
- 4. EXTENDING CREDIT TO CUSTOMERS
 - A. DETERMINING THE IMPORTANCE OF CREDIT IN THE OPERATION OF AGRICULTURAL SUPPLY AND SERVICE FIRMS
 - B. FOLLOWING THE AGRICULTURAL SUPPLY AND SERVICE FIRM'S POLICY FOR EXTENDING CREDIT
 - C. PROPERLY COMPLETING THE FORMS FOR EXTENDING CREDIT TO A CUSTOMER
 - D. GETTING THE APPROVAL FOR EXTENDING CREDIT TO A CUSTOMER WHEN SUCH A PROCEDURE IS NECESSARY
 - E. FILING THE FORMS USED TO EXTEND CREDIT
- 5. MAINTAINING RECORDS REGARDING THE FLOW OF CAPITAL
 - A. ANALYSIS OF THE DAILY BUSINESS ACTIVITIES
 - (1) CHECKING THE DAILY CASH FLOW
 - (2) CHECKING THE VOLUME OF MERCHANDISE MARKETING
 - B. CHECKING THE WEEKLY FLOW OF CAPITAL
 - C. CHECKING THE MONTHLY FLOW OF CAPITAL
 - D. CHECKING THE ANNUAL FLOW OF CAPITAL
- 6. DEPOSITING THE RECEIPTS FOR THE BUSINESS
 - A. FOLLOWING THE FIRM'S POLICIES FOR DEPOSITING THE RECEIPTS
 - B. COMPLETING THE DEPOSIT FORMS
 - C. MAKING THE DEPOSIT
- 7. MAINTAINING THE ACCOUNTS RECEIVABLE AND ACCOUNTS PAYABLE RECORDS FOR THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - A. PURPOSES OF THESE RECORDS
 - B. FORMS USED TO MAINTAIN THE ACCOUNTS PAYABLE AND ACCOUNTS RECEIVABLE
 - C. TECHNIQUES USED BY THE BUSINESS TO MAINTAIN THE ACCOUNTS PAYABLE AND ACCOUNTS RECEIVABLE RECORDS

8. CONTROLLING THE INVENTORY IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - A. PURPOSES OF KEEPING AN INVENTORY
 - B. TYPES OF INVENTORY SYSTEMS USED
 - C. ADJUSTING THE PERPETUAL INVENTORY FROM THE SALES SLIPS AND INVOICES AVAILABLE
 - D. ADJUSTING THE END-OF-MONTH INVENTORY
 - E. TAKING THE PHYSICAL INVENTORY AND RECORDING THE INFORMATION NEEDED ON THE APPROPRIATE FORMS
 - (1) RECORDING
 - (2) TOTALING
 - (3) SUMMARIZING
9. ORDERING AND RECEIVING THE SUPPLIES FOR THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - A. DETERMINING WHEN TO REORDER SUPPLIES
 - B. DETERMINING THE AMOUNT OF SUPPLIES TO REORDER BY CONSIDERING SUCH FACTORS AS SEASONAL NEEDS, ANTICIPATED SALES EVENTS, OUT-MODED PRODUCTS AND NEW PRODUCTS
 - C. COMPLETING THE PURCHASE ORDERS USED BY THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - D. RECEIVING THE SUPPLIES ORDERED BY THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - (1) RECEIVING THE MERCHANDISE
 - (2) CHECKING THE MERCHANDISE AGAINST A BILL OF LADING
 - (3) COMPLETING APPROPRIATE RECEIVING FORMS AND FILING SUCH FORMS
 - (4) DISPENSING THE MERCHANDISE TO APPROPRIATE STORAGE AREAS
10. DETERMINING THE SELLING PRICE OF VARIOUS PRODUCTS OFFERED FOR SALE BY THE AGRICULTURAL SUPPLY AND SERVICE FIRM
 - A. CONSIDERING FACTORS THAT INFLUENCE THE SELLING PRICE OF PRODUCTS AND SUPPLIES
 - (1) OVERHEAD COSTS
 - (2) COST OF THE ITEM

- (3) SERVICE COSTS
- (4) MARGIN OF PROFIT
- (5) SUPPLY
- (6) DEMAND

B. CONSIDERING HOW EACH OF THE FACTORS WILL INFLUENCE THE SELLING PRICE OF A PRODUCT AND THE FACTORS THAT WILL INFLUENCE THE OVERHEAD AND VARIABLE COSTS

- (1) DIFFERENCES BETWEEN RETAIL AND WHOLESALE COSTS
- (2) FACTORS THAT WILL INFLUENCE FIXED COSTS
- (3) FACTORS THAT WILL INFLUENCE VARIABLE COSTS

C. CALCULATING THE SELLING PRICE

- (1) DETERMINING THE PERCENTAGE MARK-UP ON COST FOR THE PRODUCT
- (2) CALCULATE THE SELLING PRICE FOR VARIOUS PRODUCTS
- (3) CALCULATE THE MARGIN

D. MARKING THE PRICES OF AGRICULTURAL SUPPLIES

- (1) DETERMINING THE PURPOSE OF MARKING
- (2) INFORMATION THAT NEEDS TO BE CONTAINED ON PRICE TICKETS
- (3) METHODS OF MARKING
 - (A) PIN AND TIE PRICE TICKETS
 - (B) GUMMED PRICE TICKETS
 - (C) RUBBER STAMPS
 - (D) PENCIL

(4) REMARKING PRICES ON PRODUCTS

11. USING OTHER EQUIPMENT USED IN AGRICULTURAL SUPPLY AND SERVICE FIRMS

- A. USING ADDING MACHINES
- B. USING CALCULATORS
- C. USING INTERCOMMUNICATION SYSTEMS
- D. USING THE TELEPHONE

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. PROVIDE THE STUDENTS WITH A LIST OF ITEMS SUCH AS 20 BAGS OF 32% BEEFMAKER, 1200 # OF SHELLED CORN, 5 TON OF 6-24-12 FERTILIZER, AND 15 TUBES OF LUBRICANT.

IN ADDITION, THE STUDENTS SHOULD HAVE ACCESS TO SALES TICKET FORMS, PRICE LISTS AND DISCOUNT LISTS USED BY A LOCAL FEED MILL. THE STUDENTS SHOULD COMPLETE SALES TICKETS BEING CERTAIN TO FILL IN THE QUANTITY, DESCRIPTION, UNIT PRICE, AMOUNT COLUMN AND CALCULATE TOTAL COST.

2. USING A CORRECTLY PREPARED SALES TICKET, A CASH REGISTER, ADEQUATE CURRENCY AND STUDENTS IN ROLE PLAYING SITUATIONS, HAVE THE STUDENTS PRACTICE OPERATING THE CASH REGISTER AND MAKING CHANGE FOR THE CUSTOMERS.
3. DEVELOP A DETAILED MONTHLY LIST OF SALES AND PURCHASES FOR AN AGRICULTURAL SUPPLY AND SERVICE FIRM. AN EXAMPLE FOR SUCH A LIST OF SALES AND PURCHASES FOR ONE DAY WOULD BE:

DATE:

3

TRANSACTION:

500 # SHELLED CORN
600 # SOYBEAN MEAL
1000 # SHELLED CORN
400 # SOYBEAN MEAL
2 BALES TWINE
12,000 # SHELLED CORN (IN)
2 TON PORKMAKER (IN)

AFTER THE TEACHER HAS DEVELOPED A DETAILED LIST FOR THE ENTIRE MONTH, HAVE THE STUDENTS COMPLETE A MONTHLY PERPETUAL INVENTORY FORM.

4. USE THE PERPETUAL INVENTORY INFORMATION TO DETERMINE WHEN ITEMS NEED TO BE REORDERED FOR STOCK AND USE VARIOUS TYPES OF PURCHASE ORDERS FOR THE STUDENTS TO COMPLETE PAYING PARTICULAR ATTENTION TO THE ORDER NUMBER, THE QUANTITY DESIRED, THE STOCK NUMBER OR DESCRIPTION AND TOTAL COST.
5. HAVE THE STUDENTS DETERMINE THE SELLING PRICE FOR VARIOUS PRODUCTS AFTER CONSIDERING THE BASE PRICE AND THE FIRM'S PERCENTAGE MARK-UP.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PROVIDE THE STUDENTS WITH INFORMATION REGARDING THE PRODUCTS PURCHASED BY A CUSTOMER, THE PRICE PER UNIT FOR THE PRODUCTS, THE FIRM'S DISCOUNT RATES, THE CHARGES FOR SUPPLEMENTARY SERVICES, SALES TAX TABLES AND SALES TICKETS. HAVE THE STUDENTS COMPLETE THE SALES TICKET WITH TOTAL ACCURACY.

2. PROVIDE STUDENTS WITH A COMPLETED SALES TICKET AND A CASH PAYMENT. HAVE THE STUDENTS PROPERLY OPERATE THE CASH REGISTER AND MAKE CORRECT CHANGE.
3. DEVELOP A CASE STUDY WHICH SHOWS THE DETAILS OF THE SALES AND PURCHASES FOR AN AGRICULTURAL SUPPLY AND SERVICE FIRM FOR ONE MONTH. HAVE THE STUDENTS COMPLETE AN APPROPRIATE INVENTORY FORM WITH COMPLETE ACCURACY.
4. PRESENT IN DETAIL THE ITEMS THAT NEED TO BE ORDERED. HAVE THE STUDENTS COMPLETE A PURCHASE ORDER FOR THE ITEMS WITH COMPLETE ACCURACY.
5. PRESENT THE STUDENTS WITH THE FOLLOWING INFORMATION FOR VARIOUS PRODUCTS: (1) BASE COST OF EACH PRODUCT AND (2) DESIRED AMOUNT OF MARK-UP FOR EACH PRODUCT. HAVE THE STUDENTS ACCURATELY CALCULATE THE PER CENT OF MARK-UP FOR EACH PRODUCT AND THE PER CENT OF GROSS MARGIN FOR EACH PRODUCT.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. APPROPRIATE FORMS THAT MAY BE USED IN AGRICULTURAL SUPPLY AND SERVICE FIRMS SUCH AS SALES TICKETS, SALES TAX EXEMPTION CARDS, DEPOSIT FORMS, PURCHASE ORDERS, RECEIVING RECORDS, INVOICES AND PERPETUAL INVENTORY AND PHYSICAL INVENTORY FORMS
2. APPROPRIATE TECHNICAL INFORMATION SUCH AS PRODUCT PRICE LISTS, SALES TAX CHARTS AND COMPANY DISCOUNT LISTS
3. APPROPRIATE COUNTER EQUIPMENT SUCH AS A SALES COUNTER, CASH REGISTER AND ADDING MACHINE OR CALCULATOR

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL BUSINESS PROCEDURES. VAS 6004. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 1972, PP. 1-32.

AN EXCELLENT STUDENT REFERENCE, SECTIONS COVERED IN THIS REFERENCE INCLUDE ORDERING AND RECEIVING MERCHANDISE, MAKING THE SALES TICKET, AND TAKING THE INVENTORY. INCLUDED ARE EXAMPLES OF VARIOUS FORMS AND RECORDS USED IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM.

2. BUSINESS PROCEDURES AND RECORDS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 101 PAGES.

A STUDENT MANUAL, THIS REFERENCE COVERS THE GENERAL AREAS OF PREPARING THE SALES TICKET, USING THE CASH REGISTER AND MAKING CHANGE, AND CONTROLLING THE INVENTORY. SPECIFIC STUDENT EXERCISES ARE COVERED IN EACH SECTION.

3. OFFICE PROCEDURES USED IN THE AGRICULTURAL SERVICES. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1969, 86 PAGES.

A STUDENT MANUAL, THE PUBLICATION PRESENTS VARIOUS DETAILED EXERCISES FOR THE STUDENTS TO COMPLETE IN SUCH AREAS AS SALES TICKETS, PURCHASE ORDERS, SALES TAX, DISCOUNTS, DAILY CASH BALANCE, END-OF-MONTH INVENTORY, AND PERPETUAL INVENTORY.

4. THE USE OF THE CASH REGISTER. VAS 6005. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 1972, 8 PAGES.

A STEP-BY-STEP PROCEDURE OF USING THE CASH REGISTER IS DETAILED IN THIS PUBLICATION.

5. WILLS, WALTER J. AN INTRODUCTION TO AGRIBUSINESS MANAGEMENT. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1973, 122 PAGES.

INCLUDED IN THIS REFERENCE ARE SECTIONS WHICH COVER THE AREAS OF CREDIT, WAREHOUSING AND INVENTORY CONTROL. THE STUDENTS WILL FIND THIS REFERENCE BRIEF AND EASY TO UNDERSTAND.

OPERATION AND CARE OF SMALL GASOLINE ENGINES

UNIT CONCEPT: PROPER STARTING, OPERATION, CLEANING, AND STORAGE OF SMALL GASOLINE ENGINES WILL RESULT IN INCREASED ENGINE EFFICIENCY AND LONGER LIFE WITH A MINIMUM OF ANNOYANCE AND EXPENSE.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. IDENTIFY THE TWO BASIC TYPES OF SMALL GASOLINE ENGINES AND EXPLAIN THEIR PRINCIPLES OF OPERATION WITH ACCURACY NEEDED TO DIFFERENTIATE BETWEEN THEM.
2. USE THE PROPER PROCEDURES FOR PREPARING TO START A SMALL GASOLINE ENGINE INCLUDING REFUELING TO PREVENT STARTING TROUBLES AND ACCIDENTS.
3. OPERATE, ADJUST ENGINE SPEED AND LOAD, AND STOP SMALL GASOLINE ENGINES USING PROCEDURES WHICH PROMOTE OPTIMUM ENGINE EFFICIENCY AND OPERATOR SAFETY.
4. PROPERLY CLEAN A SMALL GASOLINE ENGINE TO PREVENT OVER-HEATING AND EXCESSIVE WEAR DUE TO DIRT ENTERING THE ENGINE.
5. PREPARE A SMALL GASOLINE ENGINE PROPERLY FOR STORAGE OF THREE OR MORE MONTHS DURATION TO PREVENT CORROSION AND DAMAGE.

B. INSTRUCTIONAL AREAS

1. IDENTIFYING TYPES OF SMALL GASOLINE ENGINES
 - A. IDENTIFYING OPERATING PRINCIPLES OF FOUR STROKE CYCLE ENGINES
 - B. IDENTIFYING OPERATING PRINCIPLES OF TWO STROKE CYCLE ENGINES
 - C. IDENTIFYING SPECIFIC USES OF EACH TYPE OF ENGINE
2. PREPARING SMALL GASOLINE ENGINES FOR STARTING
 - A. REFUELING

- (1) SELECTING THE FUEL
- (2) MIXING THE OIL-GASOLINE MIXTURE FOR A TWO STROKE CYCLE ENGINE
- (3) FILLING THE TANK USING PROPER SAFETY PRECAUTIONS

B. STARTING

- (1) IDENTIFYING SAFETY PRECAUTIONS
- (2) CHECKING REQUIRED SERVICING
- (3) OPERATING STARTING MECHANISMS

3. OPERATING A SMALL GASOLINE ENGINE

- A. SELECTING PROPER SPEED
- B. SELECTING PROPER LOAD
- C. CORRELATING ENGINE TYPE TO SLOPE AND OTHER WORKING CONDITONS
- D. STOPPING THE ENGINE

4. CLEANING SMALL GASOLINE ENGINES

- A. CLEANING THE OUTSIDE OF THE ENGINE
- B. CLEANING THE MUFFLER AND/OR EXHAUST PORTS
- C. CLEANING THE COOLING SYSTEM

5. STORING THE ENGINE

- A. PREVENTING CORROSION AND MOISTURE BUILD-UP
- B. PREVENTING GUM DEPOSITS
- C. PREVENTING DUST BUILD-UP AND PHYSICAL DAMAGE

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. USE CUT AWAY MODELS OF TWO AND FOUR CYCLE ENGINES TO OBSERVE DIFFERENCES IN THEIR OPERATING PRINCIPLES.
2. A. MAKE A CHECK LIST OF SAFETY PROCEDURES TO FOLLOW BEFORE, DURING, AND AFTER STARTING A SMALL ENGINE.
B. PREPARE A FUEL MIXTURE FOR A TWO STROKE CYCLE ENGINE.
3. COMPARE OPERATING INSTRUCTIONS IN OPERATOR'S MANAULS OF TWO AND FOUR STROKE CYCLE ENGINES AND NOTE DIFFERENCES IN RECOMMENDATIONS.

4. BRING IN EXAMPLES OF POORLY CARED FOR ENGINES FOR THE STUDENTS TO CLEAN.
5. USE A SMALL GASOLINE ENGINE THAT WILL BE STORED FOR A LONG PERIOD OF TIME TO DEMONSTRATE CORRECT PROCEDURES TO USE TO PREPARE AN ENGINE FOR STORAGE.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. DEVELOP AN ESSAY TEST IN WHICH THE STUDENTS WILL INDICATE THE BASIC DIFFERENCES BETWEEN TWO AND FOUR STROKE CYCLE ENGINES.
2. HAVE THE STUDENTS LIST THE PROCEDURES TO FOLLOW WHEN REFUELING SMALL GASOLINE ENGINES WHICH SHOULD INCLUDE SAFETY PRECAUTIONS.
3. HAVE EACH STUDENT OPERATE A SMALL GASOLINE ENGINE UNDER WORKING CONDITIONS. EVALUATE THE STUDENT IN RELATION TO PROPER LOAD AND SPEED ADJUSTMENT AND SAFETY PROCEDURES.
4. HAVE THE STUDENTS LIST THE PROCEDURES THAT SHOULD BE FOLLOWED WHICH WILL HELP PREVENT ENTRANCE OF DIRT INTO THE ENGINE.
5. HAVE THE STUDENTS DESCRIBE THE PROCEDURE THEY WOULD FOLLOW TO PREPARE A SMALL GASOLINE ENGINE FOR STORAGE.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SMALL ENGINE HAND TOOLS
2. CUT-AWAY MODELS OF TWO AND FOUR STROKE CYCLE ENGINES
3. AIR COMPRESSOR
4. "DEGREASER" SOLVENTS
5. SMALL ENGINES IN GOOD AND POOR CONDITION

F. EXAMPLES OF SUPPORTING REFERENCES

1. SMALL ENGINES. VOLUME I. ATHENS, GEORGIA: ENGINEERING CENTER, AMERICAN ASSOCIATION FOR VOCATIONAL INSTRUCTIONAL MATERIALS. 1968, 150 PAGES.

THIS BOOKLET CONTAINS A COMPLETE DISCUSSION OF PROCEDURES FOR OPERATING AND CARING FOR SMALL GASOLINE ENGINES AND WOULD BE OF VALUE AS A STUDENT TEXT.

MAINTENANCE OF SMALL GASOLINE ENGINES

UNIT CONCEPT: REGULAR MAINTENANCE WHICH INCLUDES CLEANING THE CARBURETOR AIR CLEANER, CLEANING THE FUEL STRAINER, SELECTING AND CHANGING CRANKCASE OIL, AND SERVICING THE SPARK PLUG IS NEEDED TO OBTAIN TROUBLE-FREE SERVICE, GREATER ENGINE EFFICIENCY AND LONGER LIFE FROM SMALL GASOLINE ENGINES.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. IDENTIFY THE DIFFERENT TYPES OF CARBURETOR AIR CLEANERS COMMONLY FOUND ON SMALL GASOLINE ENGINES AND CLEAN AND SERVICE THEM ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
2. IDENTIFY THE THREE BASIC TYPES OF FUEL STRAINERS COMMONLY FOUND ON SMALL GASOLINE ENGINES AND CLEAN AND SERVICE THEM ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
3. SELECT THE RIGHT OIL, KEEP THE PROPER CRANKCASE OIL LEVEL, AND CHANGE THE OIL IN A FOUR STROKE CYCLE ENGINE ACCORDING TO MANUFACTURER'S SPECIFICATIONS FOR SMALL GASOLINE ENGINES.
4. SELECT AND SERVICE THE SPARK PLUG ON TWO AND FOUR STROKE CYCLE ENGINES ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
5. IDENTIFY THE PRINCIPLES OF CARBURETOR OPERATION IN SMALL GASOLINE ENGINES AND MAKE CARBURETOR ADJUSTMENTS FOR MOST EFFICIENT PERFORMANCE.

B. INSTRUCTIONAL AREAS

1. SERVICING CARBURETOR AIR CLEANERS

A. IDENTIFYING THE TYPES OF CARBURETOR AIR CLEANERS

- (1) OIL-BATH TYPE
- (2) OILED-FILTER TYPE
- (3) DRY-FILTER TYPE

B. IDENTIFYING REASONS FOR SERVICING AIR CLEANERS

C. IDENTIFYING METHODS OF SERVICING EACH AIR CLEANER TYPE

2. SERVICING FUEL STRAINERS

- A. IDENTIFYING TYPES OF FUEL STRAINERS
- B. IDENTIFYING PROCEDURES FOR CLEANING FUEL STRAINERS

3. LUBRICATING FOUR STROKE CYCLE ENGINES

- A. DETERMINING THE IMPORTANCE OF PROPER LUBRICATION
- B. CHECKING CRANKCASE OIL LEVEL
- C. SELECTING CRANKCASE OIL
 - (1) SINGLE VISCOSITY OILS
 - (2) MULTI-VISCOSITY OILS
- D. CHANGING CRANKCASE OIL

4. SERVICING SPARK PLUGS

- A. IDENTIFYING THE TYPES OF SPARK PLUGS
 - (1) HOT AND COLD PLUGS
 - (2) LENGTH OF REACH
- B. SELECTING THE PROPER PLUG TO MEET ENGINE CONDITIONS
- C. INSPECTING AND MAINTAINING SPARK PLUGS

5. ADJUSTING CARBURETORS

- A. IDENTIFYING THE BASIC PRINCIPLES OF CARBURETION
- B. IDENTIFYING THE COMMON TYPES OF SMALL GASOLINE ENGINE CARBURETORS
- C. MAKING CARBURETOR ADJUSTMENTS
 - (1) IDLE SPEED STOP SCREW
 - (2) LOW SPEED NEEDLE
 - (3) HIGH SPEED NEEDLE

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. DEMONSTRATE THE EFFECTS OF A DIRTY AIR CLEANER ON ENGINE PERFORMANCE BY PARTIALLY BLOCKING THE AIR INTAKE TO THE CARBURETOR AND LISTENING TO THE RESULTING ENGINE PERFORMANCE AND OBSERVING THE EFFECTS ON THE ENGINE'S POWER.

2. PRACTICE CLEANING DIFFERENT TYPES OF FUEL STRAINERS.
3. A. CONDUCT A DEMONSTRATION USING VARIOUS VISCOSITY GRADES OF OIL AND DETERGENT AND NON-DETERGENT OIL TO INDICATE DIFFERENCES IN OIL PERFORMANCE UNDER DIFFERENT ENGINE CONDITIONS.

B. CHANGE THE OIL IN A FOUR STROKE CYCLE ENGINE.
4. USING A SPARK PLUG GAUGE, CLEAN AND SET A SPARK PLUG ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
5. A. DETERMINE IF THE CARBURETOR ON A SMALL GASOLINE ENGINE IS FUNCTIONING PROPERLY BY STARTING THE ENGINE AND OBSERVING PERFORMANCE AND EXHAUST WHEN THE THROTTLE IS RAPIDLY ADVANCED.

B. PRACTICE ADJUSTING ENGINE CARBURETORS ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND BY OBSERVING ENGINE PERFORMANCE.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. HAVE EACH STUDENT SERVICE AN AIR CLEANER ON A SMALL GASOLINE ENGINE. EVALUATE THE STUDENT ON HIS CORRECTNESS OF PROCEDURE.
2. HAVE EACH STUDENT LIST THE STEPS TO FOLLOW WHEN SERVICING THE FUEL STRAINER ON A SMALL GASOLINE ENGINE.
3. HAVE EACH STUDENT LIST THE STEPS IN CHANGING OIL IN A SMALL GASOLINE ENGINE.
4. GIVE EACH STUDENT A DIRTY OR WORN SPARK PLUG TO SERVICE OR REPLACE. EVALUATE THE STUDENT ON CORRECTNESS OF PROCEDURE IN SERVICING THE PLUG OR ON SELECTING THE APPROPRIATE REPLACEMENT PLUG.
5. MAKE MALADJUSTMENTS ON A SMALL ENGINE CARBURETOR. HAVE EACH STUDENT RESET THE CARBURETOR SO THAT THE ENGINE RUNS SMOOTHLY AND EFFICIENTLY. EVALUATE THE STUDENT AS TO CORRECTNESS IN PROCEDURE AND THE RESULTING CARBURETOR AND ENGINE PERFORMANCE.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SMALL GASOLINE ENGINES
2. COMMON SMALL GASOLINE ENGINE HAND TOOLS

3. SPARK PLUG FEELER GAUGE
4. CONTAINERS FOR WASHING PARTS
5. DIFFERENT TYPES AND GRADES OF OIL
6. PETROLEUM SOLVENT
7. EXAMPLES OF SPARK PLUGS
8. OPERATOR'S MANUALS
9. IGNITION FILE

F. EXAMPLES OF SUPPORTING REFERENCES

1. SMALL ENGINES. VOLUME I. ATHENS, GEORGIA: ENGINEERING CENTER, AMERICAN ASSOCIATION OF VOCATIONAL INSTRUCTIONAL MATERIALS. 1968, 150 PAGES.

THIS BOOKLET CONTAINS A COMPLETE DISCUSSION OF MAINTENANCE PROCEDURES FOR SMALL GASOLINE ENGINES AND WOULD BE VALUABLE AS A STUDENT TEXT.

REPLACING AND MAINTAINING PULLEYS, V-BELTS AND FLAT BELTS

UNIT CONCEPT: PULLEYS AND BELTS THAT ARE PROPERLY INSTALLED AND PERIODICALLY MAINTAINED, REPAIRED AND/OR REPLACED ACCORDING TO MANUFACTURER'S SPECIFICATIONS WILL RESULT IN LESS TIME LOST DUE TO EQUIPMENT BREAKDOWNS AND MORE EFFICIENT EQUIPMENT OPERATION.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. SELECT V-BELTS AND PULLEYS TO BE USED IN A V-BELT DRIVE SYSTEM THAT WILL PROVIDE THE MOST EFFICIENT USE OF POWER CONSIDERING THE FOLLOWING FACTORS:
 - A. BELT SIZE,
 - B. PULLEY SIZES, AND
 - C. NUMBER OF BELTS.
2. REPLACE PULLEYS, V-BELTS AND FLAT BELTS NEEDING REPAIR ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

B. INSTRUCTIONAL AREAS

1. SELECTING V-BELT SIZE
 - A. DETERMINING ENGINE HORSEPOWER
 - B. DETERMINING DRIVE SHAFT SPEED
 - C. IDENTIFYING THE STANDARDIZED BELT SIZES
2. SELECTING PULLEYS
 - A. DETERMINING THE POWER SOURCE
 - B. DETERMINING THE BELT SIZE
 - C. DETERMINING THE PULLEY SPEED
 - D. IDENTIFYING CORRECT RELATIONSHIPS OF BELT SIZE AND PITCH DIAMETER RANGE

- E. CALCULATING SPEED RATIO
 - (1) DETERMINING CORRECT DRIVE PULLEY DIAMETER
 - (2) DETERMINING CORRECT DRIVEN PULLEY DIAMETER
- 3. SELECTING THE NUMBER OF BELTS TO USE
 - A. CALCULATING THE CORRECTED HORSEPOWER PER BELT
 - B. IDENTIFYING THE DESIGN HORSEPOWER
 - C. CALCULATING THE NUMBER OF BELTS NEEDED
- 4. INSPECTING PULLEYS AND V-BELTS AND FLAT BELTS FOR WEAR OR DEFECTS
 - A. CHECKING PULLEYS FOR NICKS OR BURRS
 - B. IDENTIFYING PULLEY DAMAGE OR WEAR
 - C. IDENTIFYING PULLEY MISALIGNMENT
 - D. CHECKING V-BELTS FOR PHYSICAL DAMAGE
 - E. CHECKING V-BELTS FOR CORRECT BELT TENSION
 - F. CHECKING V-BELTS FOR UNEVEN STRETCHING
 - G. CHECKING FLAT BELTS FOR CORRECT TENSION
 - H. CHECKING FLAT BELTS FOR PHYSICAL WEAR AND DAMAGE
- 5. SERVICING OR REPLACING PULLEYS, V-BELTS AND FLAT BELTS
 - A. REMOVING NICKS OR BURRS FROM PULLEYS
 - B. REPLACING WORN PULLEYS
 - C. REPLACING AND CHECKING REPLACED V-BELTS FOR PROPER INSTALLATION AND TENSION
 - (1) USING A V-BELT TENSION TESTER
 - (2) COMPUTING CENTER OF SPAN DEFLECTION DISTANCE
 - D. REPLACING AND CHECKING REPLACED FLAT BELTS FOR PROPER INSTALLATION AND TENSION

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. A. HAVE THE STUDENTS DETERMINE APPROPRIATE V-BELTS TO BE USED ON SPECIFIC EQUIPMENT BY REFERRING TO THE OPERATORS' MANUALS.

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B. HAVE THE STUDENTS REMOVE BURRS FROM THE EDGES OF PULLEYS BY USING A HAND FILE.

2. HAVE THE STUDENTS REPLACE V-BELTS ON EQUIPMENT BEING SURE THE BELT IS INSTALLED IN THE PROPER MANNER.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH OPERATORS' MANUALS ON SPECIFIC EQUIPMENT AND HAVE THEM DETERMINE THE CORRECT SIZE OF V-BELT NEEDED FOR A SPECIFIC SITUATION.
2. HAVE THE STUDENTS REPLACE V-BELTS AND ADJUST BELT TENSION ON EQUIPMENT USED IN AGRICULTURAL SUPPLY AND SERVICE FIRMS ACCORDING TO DIRECTIONS AND SPECIFICATIONS GIVEN IN THE OPERATOR'S MANUALS.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. PULLEYS AND BELTS FOR THE STUDENTS TO INSPECT
2. APPROPRIATE SMALL HAND TOOLS SUCH AS WRENCHES, SCREW-DRIVERS, STRAIGHTEDGES, RULERS AND HAND FILES

F. EXAMPLES OF SUPPORTING REFERENCES

1. OPERATOR'S MANUALS FOR THE VARIOUS ITEMS OF EQUIPMENT IN THE AGRICULTURAL SUPPLY AND SERVICE FIRM.

THESE MANUALS WILL INCLUDE TECHNICAL INFORMATION REGARDING THE SIZE OF BELTS TO INSTALL AND THE DEGREE OF TENSION TO BE PLACED ON VARIOUS BELTS.

2. PHIPPS, LLOYD J. MECHANICS IN AGRICULTURE. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1967, PP. 461-477.

INCLUDED IN THIS TEXT ARE SECTIONS REGARDING SELECTING V-BELTS, CARE OF V-BELTS, USING FLAT BELTS, CAUSES OF BELT TROUBLES AND ALIGNMENT OF SHAFTS AND PULLEYS.

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II

FEEDS

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UTILIZATION OF FEEDS AND FEEDSTUFFS BY LIVESTOCK AND POULTRY

PROVIDING NUTRIENTS FOR LIVESTOCK AND POULTRY

FORMULATING FEED MIXTURES

PREPARING FEEDS IN THE FEED MILL

PICKING UP HOME-GROWN FEED INGREDIENTS AND DELIVERING FEED

WAREHOUSING FEED

REGULATIONS IN FORMULATING AND LABELING FEED

UTILIZATION OF FEEDS AND FEEDSTUFFS BY LIVESTOCK AND POULTRY

UNIT CONCEPT: THE EMPLOYEE IN THE FEED INDUSTRY WHO IS AWARE OF HOW LIVESTOCK AND POULTRY USE FEED AND FEEDSTUFFS AND THE NUTRITIONAL REQUIREMENTS OF ANIMALS WILL BE ABLE TO ASSIST THE CUSTOMER IN DETERMINING WHAT FEEDS ARE APPROPRIATE FOR THE VARIOUS CLASSES OF LIVESTOCK AND POULTRY.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PRESENTED WITH A LIST OF FEEDS AND FEEDSTUFFS, DESCRIBE OR LIST THE FOUR MAJOR USES MADE OF FEEDS AND FEEDSTUFFS BY LIVESTOCK AND POULTRY.
2. WHEN PRESENTED WITH A SPECIFIC CASE PROBLEM, LIST OR DESCRIBE SIX REASONS WHY IT IS IMPORTANT FOR THE FARMER TO FOLLOW APPROPRIATE FEEDING, MANAGEMENT AND HEALTH PRACTICES.
3. WHEN PRESENTED WITH VARIOUS LIVESTOCK AND POULTRY, CORRECTLY IDENTIFY THE TYPE OF DIGESTIVE SYSTEM FOUND IN THE ANIMAL AND DESCRIBE THE MAJOR DIFFERENCES BETWEEN THE DIGESTIVE SYSTEMS.
4. WHEN PRESENTED WITH A LIST OF THE VARIOUS NUTRIENTS, DEFINE THE TERM AND EXPLAIN HOW THE NUTRIENT IS USED BY THE ANIMAL AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.

B. INSTRUCTIONAL AREAS

1. DETERMINING HOW FEEDS AND FEEDSTUFFS ARE UTILIZED BY POULTRY AND LIVESTOCK
 - A. PROVIDING FEED AND FEEDSTUFFS FOR MAINTENANCE
 - B. PROVIDING FEED AND FEEDSTUFFS FOR PRODUCTION
 - C. PROVIDING FEED AND FEEDSTUFFS FOR REPRODUCTION
 - D. PROVIDING FEED AND FEEDSTUFFS FOR GROWTH

2. DETERMINING WHY IT IS IMPORTANT FOR THE FARMER TO FOLLOW PROPER FEEDING PROCEDURES AND HOW THE LOCAL FEED DEALER CAN AID THE FARMER.
 - A. DETERMINING THE FEED COST AS A PERCENTAGE OF THE TOTAL COST OF PRODUCING LIVESTOCK AND POULTRY
 - B. DETERMINING WHAT INFLUENCE THE FEEDING PROGRAM HAS ON THE QUALITY OF THE PRODUCTS PRODUCED
 - C. DETERMINING HOW THE FEEDING PROGRAM INFLUENCES THE RATE OF PRODUCTION
 - D. DETERMINING HOW THE FEEDING PROGRAM AFFECTS THE EFFICIENCY OF FEED CONVERSION
 - E. DETERMINING HOW THE FEEDING PROGRAM AFFECTS THE HEALTH OF LIVESTOCK AND POULTRY
 - F. DETERMINING HOW THE FEEDING PRACTICES INFLUENCE THE FARMER'S RETURNS
3. IDENTIFYING THE VARIOUS NUTRIENTS THAT ARE PROVIDED IN FEEDS AND FEEDSTUFFS FOR LIVESTOCK AND POULTRY MAINTENANCE, PRODUCTION, GROWTH AND REPRODUCTION
 - A. PROTEINS AND THEIR USE
 - B. CARBOHYDRATES AND THEIR USE
 - C. FATS AND THEIR USE
 - D. MINERALS AND THEIR USE
 - E. VITAMINS AND THEIR USE
 - F. WATER AND ITS USE
 - G. DETERMINING WHY IT IS IMPORTANT FOR THE FEED DEALER TO BE FAMILIAR WITH THESE NUTRIENTS AND HOW HE CAN HELP THE FARMER IN PROVIDING THESE NUTRIENTS FOR THE LIVESTOCK AND POULTRY
4. DETERMINING THE TYPES AND KINDS OF FEEDS THAT MAY BE FED TO LIVESTOCK AND POULTRY TO PROVIDE THE NUTRIENTS NEEDED FOR MAINTENANCE, GROWTH, PRODUCTION AND REPRODUCTION
 - A. CONCENTRATES
 - (1) GRAINS
 - (2) PROTEIN SUPPLEMENTS

B. ROUGHAGES

- (1) HAY
- (2) SILAGES
- (3) PASTURE

C. OTHER CLASSIFICATIONS AND TYPES OF FEEDS

- (1) FINE AND COARSE FEEDS
- (2) GROWING AND FATTENING FEEDS
- (3) NURSING FEEDS
- (4) LAXATIVE FEEDS
- (5) PRODUCTION FEEDS
- (6) OTHER SPECIAL NUTRITIONAL FEEDS

D. SPECIALIZED FEED ADDITIVES

- (1) ANTIBIOTICS SUCH AS PENICILLIN, AUREOMYCIN, STREPTOMYCIN, TERRAMYCIN
- (2) HORMONES SUCH AS STIBESTROL, THYROPROTEIN
- (3) TRANQUILIZERS
- (4) CHEMOBIOTICS SUCH AS ARSENICALS, RUMEN CULTURES

5. CONVERTING THE FEED AND FEEDSTUFFS INTO USABLE FORMS BY THE ANIMALS

A. THE RUMINANT DIGESTIVE SYSTEM

- (1) ANIMALS WITH RUMINANT DIGESTIVE SYSTEMS
- (2) THE RUMINANT DIGESTIVE PROCESS
- (3) DETERMINING WHAT INFLUENCE THIS HAS ON FEEDING PRACTICES FOR RUMINANTS

B. THE MONOGASTRIC DIGESTIVE SYSTEM

- (1) ANIMALS WITH MONOGASTRIC DIGESTIVE SYSTEMS
- (2) THE MONOGASTRIC DIGESTIVE SYSTEM
- (3) DETERMINING WHAT INFLUENCE THIS HAS ON FEEDING PRACTICES FOR MONOGASTRICS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. HAVE EACH STUDENT TAKE A SPECIFIC ANIMAL SUCH AS A DAIRY COW, BEEF CALF, FEEDER PIG, LAYING HEN AND DESCRIBE TO THE CLASS WHAT PRODUCTS ARE PRODUCED BY THE ANIMAL AND WHETHER FEED IS USED BY THE ANIMAL FOR GROWTH, MAINTENANCE, PRODUCTION, REPRODUCTION OR A COMBINATION THEREOF.
- 2. A. PRESENT THE STUDENTS WITH A CASE PROBLEM WHEREIN A DESCRIPTION IS MADE OF THE NUMBER OF ANIMALS FED, THE AVERAGE BEGINNING WEIGHT, THE AVERAGE SELLING WEIGHT,

THE TOTAL POUNDS OF FEEDS CONSUMED, THE TOTAL COST OF THE FEED, TOTAL PRODUCTION COSTS AND THE LENGTH OF FEEDING PERIOD. HAVE THE STUDENTS CALCULATE:

- A. FEED CONVERSION RATIO,
 - B. AVERAGE DAILY GAIN,
 - C. COST PER POUND OF GAIN,
 - D. THE PROPORTION OF TOTAL COST THAT FEED COSTS REPRESENT, AND
 - E. NET PROFIT.
- B. VISIT A LOCAL FEED DEALER AND HAVE THE STUDENTS DISCUSS WITH HIM HOW HE ASSISTS FARMERS IN SOLVING FEEDING PROBLEMS AND WHAT PRODUCTS AND SERVICES HE PROVIDES FOR FARMERS.
3. HAVE THE LOCAL VETERINARIAN VISIT THE CLASS AND DISCUSS WITH THE STUDENTS THE RUMINANT AND MONOGASTRIC DIGESTIVE SYSTEMS. ADDITIONALLY, HAVE EACH STUDENT SELECT A SPECIFIC ANIMAL AND DETERMINE WHETHER IT IS CLASSIFIED AS A RUMINANT OR A MONOGASTRIC.
 4. HAVE GROUPS OF STUDENTS SELECT ONE OF THE MAJOR NUTRIENTS AND DESCRIBE TO THE REMAINDER OF THE CLASS WHY THE NUTRIENT IS IMPORTANT TO ANIMALS AND HOW THE NUTRIENT IS USED BY ANIMALS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. DEVELOP A COMPLETION EXERCISE IN CONJUNCTION WITH A SLIDE SERIES WHICH SHOWS VARIOUS FARM ANIMALS. FOR EACH ANIMAL SHOWN ON THE SLIDES, HAVE THE STUDENTS LIST THE MAJOR USES MADE OF FEEDS AND FEEDSTUFFS FOR THE ANIMAL AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
2. HAVE THE STUDENTS LIST SIX REASONS WHY A FARMER NEEDS TO FOLLOW PROPER FEEDING PROCEDURES AND PRACTICES.
3. FROM A SERIES OF SLIDES OF ANIMALS, HAVE THE STUDENTS INDICATE WHETHER THE ANIMAL IS A RUMINANT OR A MONOGASTRIC WITH COMPLETE ACCURACY.
4. DEVELOP A MATCHING EXERCISE. ONE COLUMN SHOULD CONTAIN THE VARIOUS USES OF THE FIVE MAJOR NUTRIENTS AND A SECOND COLUMN SHOULD CONTAIN THE FIVE NUTRIENTS. HAVE THE STUDENTS COMPLETE THE EXERCISE AT A LEVEL OF PER-

PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. CHARTS AND SLIDES SHOWING THE DIGESTIVE SYSTEMS
2. SLIDES OF VARIOUS ANIMALS
3. PROJECTOR AND SCREEN
4. ACCESS TO THE MOVIE, "THE RUMEN STORY," FROM RALSTON PURINA COMPANY, ST. LOUIS, MISSOURI
5. SLIDES WHICH SHOW ANIMALS RECEIVING PROPER FEEDING AND ANIMALS IMPROPERLY FED
6. CASE STUDIES FOR THE STUDENTS TO SOLVE REGARDING FEED COSTS, FEED CONVERSION RATE AND AVERAGE DAILY GAIN
7. SLIDES SHOWING VARIOUS FEEDING PRACTICES USED BY FARMERS
8. DIGESTIVE TRACTS FROM SLAUGHTER HOUSES

F. EXAMPLES OF SUPPORTING REFERENCES

1. ANIMAL NUTRITION HANDBOOK. CURRENT EDITION. ST. LOUIS, MISSOURI: RALSTON PURINA COMPANY. PP. 11-26.

THIS REFERENCE DISCUSSES THE DIGESTIVE SYSTEM AND THE VARIOUS NUTRIENTS. A SECTION ALSO COVERS THE DEFICIENCY SYMPTOMS OF VARIOUS ELEMENTS AND THE SOURCES OF SUCH ELEMENTS.

2. BUNDY, CLARENCE E. AND DIGGINS, RONALD V. LIVESTOCK AND POULTRY PRODUCTION. ENGLEWOOD CLIFFS, NEW JERSEY: PRENTICE-HALL, INC. 1968, PP. 3-13, 220-273, 330-380, 405-428, 464-523, AND 498-636.

THIS STUDENT REFERENCE COVERS IN SEVERAL PAGES THE VARIOUS NUTRIENTS IN FEED AND THE FUNCTION OF THE NUTRIENTS IN ANIMAL PRODUCTION, MAINTENANCE, GROWTH AND REPRODUCTION. THIS REFERENCE COVERS THE FEEDING OF BEEF CATTLE, DAIRY CATTLE, SHEEP, HOGS AND POULTRY.

3. DIGESTION IN ANIMALS. VAS 1026. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.

THIS PUBLICATION COVERS THE DIGESTIVE SYSTEM IN MONO-GASTRICS AND RUMINANTS AS IT RELATES TO THE CONVERSION OF FEED AND FEEDSTUFFS INTO MEAT AND MILK.

4. PERRY, T. W. FEED FORMULATIONS HANDBOOK. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1971, PP. 17-44, 59-104.

THIS REFERENCE, ALTHOUGH TOO DETAILED IN SOME SECTIONS FOR STUDENTS TO USE, PRESENTS A BRIEF REVIEW OF THE NUTRIENTS IN FEEDS AND THEIR PURPOSES ALONG WITH A BRIEF REVIEW OF THE NUTRITIONAL REQUIREMENTS FOR VARIOUS ANIMALS.

5. PLANK, HARRY. FEEDS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, PP. 1-11.

THIS STUDENT REFERENCE COVERS IN SEVERAL PAGES THE VARIOUS NUTRIENTS IN FEED AND THE FUNCTION OF THE NUTRIENTS IN ANIMAL PRODUCTION, MAINTENANCE, GROWTH AND REPRODUCTION. THIS REFERENCE COVERS THE FEEDING OF BEEF CATTLE, DAIRY CATTLE, SHEEP, HOGS AND POULTRY.

PROVIDING NUTRIENTS FOR LIVESTOCK AND POULTRY

UNIT CONCEPT: BASED UPON A KNOWLEDGE OF THE NUTRIENT NEEDS OF THE VARIOUS CLASSES OF LIVESTOCK AND POULTRY AND THE DIGESTIVE SYSTEM OF THE ANIMAL, THE EMPLOYEE IN THE FEED MILL SHOULD BE ABLE TO ASSIST IN ANSWERING THE CUSTOMER'S QUESTIONS REGARDING THE TYPES OF FEEDS SUITABLE FOR THE ANIMAL AND THE FORM IN WHICH THE FEED SHOULD BE PROVIDED.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN GIVEN INFORMATION REGARDING THE LIVESTOCK OR POULTRY TO BE FED AND APPROPRIATE TECHNICAL REFERENCES, DETERMINE THE CORRECT NUTRIENT REQUIREMENTS FOR THE LIVESTOCK AND POULTRY.
2. WHEN GIVEN APPROPRIATE TECHNICAL INFORMATION REGARDING THE LIVESTOCK OR POULTRY TO BE FED AND THE TYPES OF FEEDS AVAILABLE, DETERMINE WHICH FEEDS ARE APPROPRIATE TO USE IN FEEDING GIVEN ANIMALS ACCORDING TO STANDARDS ESTABLISHED IN MORRISON'S FEEDS AND FEEDING, MORRISON PUBLISHING COMPANY, ITHACA, NEW YORK.
3. WHEN PRESENTED WITH APPROPRIATE TECHNICAL INFORMATION REGARDING THE ANIMALS TO BE FED, DETERMINE AN APPROPRIATE PHYSICAL FORM (GROUND, PELLETED, CRIMPED) IN WHICH THE PROCESSED FEED SHOULD BE PREPARED TO THE SATISFACTION OF THE TEACHER OR EMPLOYER.

B. INSTRUCTIONAL AREAS

1. DETERMINING THE NUTRITIONAL NEEDS OF LIVESTOCK AND POULTRY
 - A. IDENTIFYING VARIOUS FACTORS THAT WILL INFLUENCE THE NUTRITIONAL REQUIREMENTS OF VARIOUS ANIMALS SUCH AS:
 - (1) CLASS OF LIVESTOCK AND POULTRY
 - (2) AGE OF THE ANIMAL OR WEIGHT OF ANIMAL
 - (3) PRODUCTION LEVEL OF THE ANIMAL OR STAGE OF PRODUCTION
 - B. USING TECHNICAL REFERENCES TO LOCATE THE NUTRITIONAL REQUIREMENTS

- (1) USING PUBLICATIONS SUCH AS MORRISON'S FEEDS AND FEEDING (MORRISON PUBLISHING COMPANY, ITHACA, NEW YORK) AND LIVESTOCK AND POULTRY PRODUCTION (PRENTICE-HALL, INC., ENGLEWOOD CLIFFS, NEW JERSEY) TO LOCATE SPECIFIC NUTRITIONAL REQUIREMENTS
 - (2) USING THE FIRM'S TECHNICAL PUBLICATIONS FOR LOCATING SPECIFIC NUTRIENT REQUIREMENTS
- C. DEVELOPING A LIST OF PRINCIPLES HELPFUL WHEN DETERMINING THE FEED REQUIREMENTS OF LIVESTOCK AND POULTRY
- (1) THE DIFFERENCES BETWEEN RUMINANTS AND MONO-GASTRICS
 - (A) THE INFLUENCE OF THE DIGESTIVE SYSTEM ON THE TYPES (ROUGHAGES AND CONCENTRATES) OF FEED THAT MAY BE FED
 - (B) THE INFLUENCE OF THE DIGESTIVE SYSTEM ON THE NUMBER OF ESSENTIAL NUTRIENTS THAT MUST BE FED
 - (2) THE DIFFERENT PROTEIN LEVELS REQUIRED FOR YOUNG OR OLDER ANIMALS
 - (3) THE VITAMINS AND MINERALS THAT MUST BE SUPPLIED FOR ANIMALS
 - (4) THE UTILIZATION OF CERTAIN FEED ADDITIVES IN FEEDS
2. DETERMINING WHAT FEEDS AND FEEDSTUFFS ARE APPROPRIATE FOR FEEDING SPECIFIC CLASSES OF LIVESTOCK AND POULTRY
- A. USING FEEDS RELATIVELY HIGH IN FIBER AND BULK AND LOW IN TOTAL DIGESTIVE NUTRIENTS (TDN) AND DIGESTIBLE ENERGY - ROUGHAGES
- (1) IDENTIFYING THE VARIOUS KINDS OF ROUGHAGES THAT MAY BE FED SUCH AS:
 - (A) HAY
 - (B) SILAGES
 - (C) GROUND CORN COBS
 - (D) OTHER LOW-GRADE MILLING BY-PRODUCTS
 - (2) DETERMINING THE RELATIVE NUTRITIVE VALUES FOR THE VARIOUS ROUGHAGES AS FEED FOR LIVESTOCK AND POULTRY
- B. USING FEEDS LOW IN FIBER AND HIGH IN TDN AND ENERGY-GRAIN CONCENTRATES

- (1) * IDENTIFYING THE VARIOUS KINDS OF GRAIN CONCENTRATES THAT MAY BE FED SUCH AS:
 - (A) CORN
 - (B) WHEAT
 - (C) OATS
 - (D) BARLEY
 - (E) SORGHUM
 - (F) OTHER GRAIN CONCENTRATES GROWN IN THE LOCAL COMMUNITY
- (2) DETERMINING THE RELATIVE NUTRITIVE VALUES FOR THE VARIOUS GRAIN CONCENTRATES AS FEED FOR LIVESTOCK AND POULTRY
- C. USING FEEDS EXTRA-LOW IN FIBER AND EXTRA-HIGH IN TDN AND ENERGY - COMMERCIAL SUPPLEMENTS
 - (1) IDENTIFYING THE VARIOUS KINDS OF COMMERCIAL CONCENTRATES SUCH AS:
 - (A) SOYBEAN OIL MEAL
 - (B) COTTONSEED OIL MEAL
 - (C) LINSEED OIL MEAL
 - (D) OTHER COMMERCIAL CONCENTRATES COMMONLY USED IN THE LOCAL AREA
 - D. CONSIDERING VARIOUS FACTORS THAT WILL INFLUENCE THE NUTRITIVE VALUE OF FEEDS AND FEEDSTUFFS
 - (1) MOISTURE CONTENT
 - (2) MATURITY OF INGREDIENTS AT HARVEST
 - (3) SOIL FERTILITY LEVEL
 - (4) PHYSICAL FORM OF THE FEED INGREDIENTS
3. DETERMINING THE APPROPRIATE PHYSICAL FORM IN WHICH FEED SHOULD BE FED TO VARIOUS CLASSES OF LIVESTOCK AND POULTRY
 - A. IDENTIFYING THE VARIOUS PHYSICAL FORMS IN WHICH FEED MAY BE PREPARED
 - (1) GROUND INGREDIENTS
 - (2) ROLLED INGREDIENTS
 - (3) PELLETED INGREDIENTS
 - (4) CRIMPED INGREDIENTS
 - (5) OTHER PHYSICAL PROCESSING FORMS USED BY THE LOCAL FEED FIRMS
 - B. DETERMINING HOW THE FORM IN WHICH FEED IS PREPARED INFLUENCES THE UTILIZATION OF THE FEED BY THE ANIMALS

- C. DETERMINING THE FORM IN WHICH THE FEED SHOULD BE PREPARED FOR SPECIFIC ANIMALS OF VARIOUS AGES

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. A. HAVE THE STUDENTS DEVELOP A CHART WHICH SHOWS THE VARIOUS CLASSES OF LIVESTOCK AT VARIOUS AGES AND THE PER CENT OF CRUDE PROTEIN NEEDED BY THE ANIMALS.

B. HAVE THE STUDENTS DEVELOP A CHART WHICH COMPARES THE ANIMAL AND VEGETABLE PROTEINS USED IN FEEDING MIXTURES ON THE BASIS OF QUALITY AND PRICE.

C. HAVE THE STUDENTS COLLECT SAMPLES OF COMMON ROUGHAGES AND CONCENTRATES USED IN THE COMMUNITY AND LABEL EACH SAMPLE SHOWING THE NUTRIENTS PRESENT AND DEFICIENT IN EACH.
2. USING VARIOUS SAMPLES OF ROUGHAGES AND CONCENTRATES, HAVE THE STUDENTS IDENTIFY THE NAME OF THE FEED BY SIGHT AND TASTE.
3. HAVE THE STUDENTS SURVEY THE LOCAL FARMERS AND FEED DEALERS TO DETERMINE THE VARIOUS PHYSICAL FORMS IN WHICH MOST FEED IS FED TO VARIOUS CLASSES OF LIVESTOCK AND POULTRY. HAVE THE STUDENTS PREPARE A CHART WHICH SHOWS THE VARIOUS CLASSES AND AGES OF LIVESTOCK AND POULTRY AND THE FORM IN WHICH THE FEED SHOULD BE PREPARED.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. A. DEVELOP A MULTIPLE CHOICE AND OBJECTIVE TEST WHICH FOCUSES UPON THE NUTRIENT REQUIREMENTS FOR VARIOUS CLASSES OF LIVESTOCK AND POULTRY. USING APPROPRIATE TECHNICAL REFERENCES WHEN NECESSARY, HAVE THE STUDENTS COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL INSTRUCTOR.

B. PRESENT THE STUDENTS WITH INFORMATION REGARDING VARIOUS CLASSES AND AGES OF LIVESTOCK AND POULTRY. USING THE LOCAL FEED FIRM'S TECHNICAL PUBLICATIONS, HAVE THE STUDENTS DETERMINE THE CORRECT CRUDE PROTEIN REQUIREMENTS FOR THE ANIMALS.
2. DEVELOP A MULTIPLE CHOICE-TYPE EXERCISE WHICH CONTAINS INFORMATION REGARDING CLASSES OF LIVESTOCK AND POULTRY AND SPECIFIC KINDS OF GRAIN CONCENTRATES, PROTEIN CONCENTRATES AND ROUGHAGES WHICH MAY BE FED. HAVE THE

STUDENTS COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL INSTRUCTOR.

3. DEVELOP A CASE STUDY FOR THE STUDENTS WHICH CONTAINS THE INGREDIENTS TO BE USED IN A FEED MIXTURE AND THE LIVESTOCK OR POULTRY TO BE FED. HAVE THE STUDENTS SUGGEST APPROPRIATE FORMS OF PREPARATION FOR THE VARIOUS INGREDIENTS FOR THE FEED MIXTURE. EVALUATE THE STUDENTS' ANSWERS AGAINST THE GENERAL PRACTICES FOLLOWED BY THE LOCAL FEED INDUSTRY.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SAMPLES OF ROUGHAGES, GRAIN CONCENTRATES AND COMMERCIAL SUPPLEMENTS
2. SAMPLES OF THE VARIOUS PHYSICAL FORMS IN WHICH FEEDS MAY BE PREPARED
3. POSTER BOARD FOR DEVELOPING CHARTS
4. SMALL BOTTLES OR OTHER CONTAINERS WHICH THE STUDENTS MAY USE TO DEVELOP A DISPLAY OF VARIOUS FEED INGREDIENTS
5. LABELS FOR THE SMALL BOTTLES OR OTHER CONTAINERS

F. EXAMPLES OF SUPPORTING REFERENCES

1. BUNDY, CLARENCE E. AND DIGGINS, RONALD V. LIVESTOCK AND POULTRY PRODUCTION. ENGLEWOOD CLIFFS, NEW JERSEY: PRENTICE-HALL, INC. 1968, PP. 14-30.

THIS REFERENCE PRESENTS A GENERAL OVERVIEW OF THE VARIOUS CLASSES OF FEED AND THE SPECIFIC NUTRIENTS VARIOUS FEEDS PROVIDE.

2. MORRISON, FRANK B. FEEDS AND FEEDING. ITHACA, NEW YORK: MORRISON PUBLISHING COMPANY. 1957, PP. 57-60.

THIS REFERENCE WHICH PROVIDES MUCH TECHNICAL INFORMATION ON THE VALUE OF VARIOUS ROUGHAGES AND CONCENTRATES ALSO HAS A BRIEF SECTION WHICH COVERS THE INFLUENCE OF VARIOUS FORMS OF FEED IN THEIR USEFULNESS FOR VARIOUS CLASSES OF ANIMALS.

3. PLANK, HARRY. FEEDS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, PP. 22-24.

A STUDENT REFERENCE, THIS PUBLICATION COVERS THE THREE MAJOR FORMS OF FEED - MASH, PELLETS, AND CRUMBLES. THIS REFERENCE DIFFERENTIATES BETWEEN THESE VARIOUS FORMS, IDENTIFIES THE VARIOUS STEPS INVOLVED IN EACH PROCESS, AND LISTS ADVANTAGES OF ONE FORM OVER ANOTHER.

FORMULATING FEED MIXTURES

UNIT CONCEPT: THE FEED FIRM EMPLOYEE WHO IS AWARE OF THE VARIOUS NUTRIENT REQUIREMENTS OF LIVESTOCK AND POULTRY AND THE VARIOUS INGREDIENTS AVAILABLE FOR PROVIDING THESE NUTRIENTS MAY ASSIST THE FARMER IN FORMULATING PALATABLE, BALANCED AND ECONOMICAL FEED MIXTURES.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PRESENTED WITH APPROPRIATE TECHNICAL INFORMATION AND INFORMATION REGARDING THE LIVESTOCK OR POULTRY TO BE FED, ASSIST IN CORRECTLY BALANCING RATIONS FOR ANIMALS ACCORDING TO STANDARDS SET FORTH IN TECHNICAL FEEDING PUBLICATIONS.
2. WHEN BALANCING RATIONS FOR A CUSTOMER, FORMULATE THE MOST ECONOMICAL BALANCED RATION BY USING GRAIN AND SUPPLEMENT SUBSTITUTES AVAILABLE TO THE CUSTOMER.
3. WHEN BALANCING RATIONS FOR A CUSTOMER, ADD FEED ADDITIVES AND MEDICATIONS TO A RATION FOR SPECIFIC ANIMALS IN COMPLIANCE WITH A VETERINARIAN'S REQUEST AND IN ACCORDANCE WITH FEDERAL DRUG ADMINISTRATION (FDA) AND STATE REGULATIONS.

B. INSTRUCTIONAL AREAS

1. CONSIDERING IMPORTANT FACTORS FOR FORMULATING FEED MIXTURES
 - A. CONSIDERING THE SPECIFIC NUTRIENT REQUIREMENTS FOR THE LIVESTOCK OR POULTRY TO BE FED
 - B. CONSIDERING THE PALATABILITY OF THE INGREDIENTS TO BE USED
 - C. CONSIDERING THE DIGESTIBILITY OF THE INGREDIENTS AVAILABLE
 - D. CONSIDERING THE VITAMIN CONTENT OF THE INGREDIENTS AVAILABLE
 - E. CONSIDERING THE MINERAL CONTENT OF THE INGREDIENTS

- F. CONSIDERING THE AVAILABILITY OF SUBSTITUTE INGREDIENTS
- G. CONSIDERING THE COST OF THE INGREDIENTS
- 2. SUBSTITUTING VARIOUS FEED INGREDIENTS TO ATTAIN THE MOST ECONOMICAL RATIONS AND FEED MIXTURES
 - A. RECOGNIZING SPECIAL PRECAUTIONS THAT NEED TO BE OBSERVED IN SUBSTITUTING VARIOUS FEEDSTUFFS FOR OTHERS IN THE RATIONS AND MIXTURES OF CERTAIN CLASSES AND AGES OF LIVESTOCK AND POULTRY
 - B. DETERMINING THE KINDS AND AMOUNTS OF FEEDSTUFFS THAT CAN BE SUBSTITUTED IN A SPECIFIC RATION AND MIXTURE
- 3. CALCULATING BALANCED AND ECONOMICAL RATIONS FOR SPECIFIC CLASSES AND AGES OF LIVESTOCK AND POULTRY
 - A. DETERMINING THE SPECIFIC NUTRITIONAL REQUIREMENTS NEEDED USING APPROPRIATE REFERENCE MATERIALS
 - B. DETERMINING THE NUTRITIONAL VALUES OF VARIOUS FEEDS TO BE USED IN THE RATION
 - C. USING THE PEARSON SQUARE METHOD TO FORMULATE A BALANCED RATION
 - D. USING THE TOTAL DIGESTIBLE PROTEIN METHOD TO FORMULATE A BALANCED RATION
 - E. USING FEEDING AND MIXING CHARTS AND GUIDES FROM VARIOUS SOURCES TO FORMULATE RATIONS
 - (1) LOCATING THESE VARIOUS MIXING AND FEEDING CHARTS
 - (A) CHARTS ON THE BACK OF SUPPLEMENT BAGS
 - (B) CHARTS IN THE COMMERCIAL FEED COMPANY PUBLICATIONS
 - (C) CHARTS IN A MILL FOREMAN'S MIXING GUIDE
 - (2) INTERPRETING THE INFORMATION CONTAINED ON THE FEEDING AND MIXING GUIDES OR CHARTS
 - (3) CALCULATING RATIONS AND FEED MIXTURES FROM THE INFORMATION CONTAINED IN THE FEEDING AND MIXING GUIDES OR CHARTS
- 4. USING VARIOUS ADDITIVES AND MEDICATIONS IN THE RATIONS AND MIXTURES FOR VARIOUS ANIMALS
 - A. DETERMINING WHAT POLICIES ARE OBSERVED BY LOCAL FEED FIRMS WHEN USING FEED ADDITIVES

- B. PRECAUTIONS TO OBSERVE WHEN USING FEED ADDITIVES
- C. FOLLOWING FDA AND STATE STANDARDS AND REGULATIONS AND VETERINARIAN RECOMMENDATIONS IN FORMULATING RATIONS AND MIXTURES AFTER PROPER DIAGNOSIS AND PROGNOSIS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. A. HAVE THE STUDENTS DETERMINE THE PER CENT OF CRUDE PROTEIN NEEDED IN A RATION FOR A SPECIFIC CLASS OF ANIMALS AND USE THE PEARSON SQUARE METHOD TO BALANCE A RATION USING FARM-RAISED GRAINS AND COMMERCIAL SUPPLEMENTS.

B. HAVE THE STUDENTS DETERMINE THE AMOUNT OF INGREDIENTS THAT NEED TO BE MIXED WITH 32% DAIRY SUPPLEMENT ACCORDING TO DIRECTIONS DETAILED ON THE FEEDING AND MIXING TABLE ON THE BACK OF A SUPPLEMENT TAG.
2. HAVE THE STUDENTS DEVELOP SEVERAL RATIONS USING DIFFERENT FEEDS FOR A SPECIFIC ANIMAL THAT ARE BALANCED AND DETERMINE THE COST OF EACH RATION. USE POSTER BOARD TO DISPLAY THESE RATIONS AND THEIR RELATIVE COSTS.
3. HAVE THE CLASS TOUR A MEAT PROCESSING PLANT AND DISCUSS WITH THE FEDERAL INSPECTOR THE CAUSES OF RESIDUES FOUND IN THE MEAT OF SLAUGHTERED ANIMALS AND HOW THE FORMULATION OF RATIONS AND THE USE OF ADDITIVES AND MEDICATIONS WILL INFLUENCE THE EXTENT TO WHICH A RESIDUE IS FOUND IN THE MEAT.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. A. PRESENT THE STUDENTS WITH SEVERAL RATIONS AND FEED MIXTURES THAT HAVE BEEN CALCULATED FOR A SPECIFIC CLASS OF LIVESTOCK OR POULTRY. SOME OF THESE RATIONS SHOULD BE PROPERLY BALANCED. USING APPROPRIATE TECHNICAL REFERENCES, HAVE THE STUDENTS DETERMINE WHICH RATIONS ARE PROPERLY BALANCED AND WHICH ARE NOT PROPERLY BALANCED.

B. PROVIDE THE STUDENTS WITH A COPY OF A FEEDING AND MIXING GUIDE WHICH IS COMMONLY USED BY A LOCAL FEED FIRM FOR A SPECIFIC CLASS OF LIVESTOCK OR POULTRY. HAVE THE STUDENTS CORRECTLY CALCULATE THE NUMBER OF POUNDS OF SUPPLEMENT AND THE NUMBER OF POUNDS OF OTHER INGREDIENTS THAT NEED TO BE MIXED TO MAKE A SPECIFIED AMOUNT OF A CERTAIN PERCENTAGE OF MIXED FEED.

2. PRESENT THE STUDENTS WITH SEVERAL BALANCED RATIONS FOR A CLASS OF LIVESTOCK OR POULTRY WHICH CONTAINS DIFFERENT INGREDIENTS. USING GIVEN COST FIGURES FOR THE INGREDIENTS, HAVE THE STUDENTS CALCULATE THE CORRECT COST FOR EACH RATION AND DETERMINE WHICH IS THE MOST INEXPENSIVE BALANCED RATIONS.
3. PRESENT THE STUDENTS WITH A REQUEST FROM A VETERINARIAN TO ADD A SPECIFIC MEDICATION TO A FEED MIXTURE. HAVE THE STUDENTS USE FDA AND STATE STANDARDS AND REGULATIONS TO DETERMINE IF THE AMOUNT OF ADDITIVE TO BE ADDED IS IN COMPLIANCE WITH THESE REGULATIONS.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. EXAMPLES OF FEEDING AND MIXING GUIDES OR CHARTS WHICH WOULD BE AVAILABLE IN LOCAL FEED FIRMS
2. FORMS FOR USING THE PEARSON SQUARE METHOD FOR BALANCING THE BUDGET
3. TECHNICAL REFERENCES WHICH CONTAIN THE NUTRITIVE VALUES FOR VARIOUS FEEDS AND THE REQUIREMENTS FOR VARIOUS CLASSES OF LIVESTOCK
4. FDA AND STATE REGULATIONS AND STANDARDS

F. EXAMPLES OF SUPPORTING REFERENCES

1. BUNDY, CLARENCE E. AND DIGGINS, RONALD V. LIVESTOCK AND POULTRY PRODUCTION. ENGLEWOOD CLIFFS, NEW JERSEY: PRENTICE-HALL, INC. 1968, PP. 86-148, 220-267, 330-374, 464-519, AND 608-652.

THIS REFERENCE DISCUSSES THE NUTRIENT NEEDS OF LIVESTOCK AND POULTRY AT VARIOUS STAGES OF DEVELOPMENT AND PRODUCTION AND PRESENTS EXAMPLES OF RATIONS THAT HAVE BEEN USED WHICH UTILIZE VARIOUS FEEDS.

2. ENSMINGER, M. E. THE STOCKMAN'S HANDBOOK. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1970, PP. 47-136.

THIS SECTION OF THIS REFERENCE CONTAINS MUCH TECHNICAL INFORMATION THAT WILL BE NEEDED TO FORMULATE RATIONS FOR VARIOUS CLASSES OF LIVESTOCK AND POULTRY. VARIOUS RATIONS ARE PRESENTED FOR FEEDING AT DIFFERENT STAGES OF PRODUCTION AND DEVELOPMENT. A DETAILED DESCRIPTION OF HOW TO USE THE PEARSON SQUARE METHOD TO BALANCE RATIONS IS PROVIDED IN ADDITION TO FEED SUBSTITUTION TABLES.

3. MORRISON, FRANK B. FEEDS AND FEEDING. ITHACA, NEW YORK: MORRISON PUBLISHING COMPANY. 1957, 1165 PAGES.

THROUGHOUT THIS REFERENCE ARE CHAPTERS WHICH RELATE TO THE FEEDING OF VARIOUS CLASSES OF LIVESTOCK AND POULTRY WITH EXAMPLE RATIONS. TABLES IN THE APPENDIX PROVIDE TECHNICAL INFORMATION REGARDING THE NUTRITIONAL VALUE OF VARIOUS FEEDS AND THE NUTRITIONAL REQUIREMENTS OF VARIOUS ANIMALS.

4. PERRY, T. S. FEED FORMULATIONS HANDBOOK. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1971, PP. 9-16, 105-109, AND 177-181.

THIS REFERENCE COVERS VERY BRIEFLY THE BASIC CONSIDERATIONS NECESSARY IN FORMULATING A RATION WITH SPECIAL ATTENTION GIVEN TO THE ASPECT OF DIGESTIBILITY. A BRIEF SECTION PROVIDES THE SAME GENERAL GUIDELINES AND SUGGESTIONS IN FORMULATING RATIONS FOR VARIOUS CLASSES OF LIVESTOCK AND POULTRY.

PREPARING FEEDS IN THE FEED MILL

UNIT CONCEPT: AN EMPLOYEE IN THE FEED MILL WHO CAN FOLLOW INSTRUCTIONS REGARDING THE PREPARATION OF A COMPLETE FEED MIXTURE BY OPERATING THE VARIOUS ITEMS OF EQUIPMENT IN THE FEED MILL WILL PROVIDE A SATISFACTORY PRODUCT FOR THE CUSTOMER IN A MINIMAL AMOUNT OF TIME WHILE MINIMIZING WEAR ON THE PREPARATION EQUIPMENT.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN GIVEN A WRITTEN REQUEST FOR A FEED MIXTURE, OBTAIN THE PROPER INGREDIENTS AND WEIGH THE CORRECT AMOUNT OF INGREDIENTS TO BE USED IN THE COMPLETE FEED MIXTURE.
2. WHEN WORKING IN THE FEED MILL, FOLLOW APPROVED SAFETY PRECAUTIONS AS DETAILED IN THE EQUIPMENT OPERATOR'S MANUALS AND AS INSTRUCTED BY THE EMPLOYER.
3. WHEN WORKING IN THE FEED MILL, CORRECTLY OPERATE THE EQUIPMENT AS DETAILED IN THE OPERATOR'S MANUALS.
4. WHEN WORKING IN THE FEED MILL, LUBRICATE, SERVICE, ADJUST AND MAKE MINOR REPAIRS ON THE EQUIPMENT USED TO PREPARE FEEDS FOR DISTRIBUTION OR WAREHOUSING TO THE SATISFACTION OF THE EMPLOYER AND AS DIRECTED IN THE EQUIPMENT OPERATING MANUALS.
5. WHEN WORKING IN THE FEED MILL, DRAW OFF THE PREPARED FEED FROM THE FEED MIXER AND PREPARE IT FOR BULK DELIVERY OR STORAGE TO THE SATISFACTION OF THE EMPLOYER.
6. WHEN WORKING IN THE FEED MILL, DRAW OFF THE PREPARED FEED FROM THE FEED MIXER AND BAG THE FEED BY TYING A MILLER'S KNOT IN FIVE SECONDS.

B. INSTRUCTIONAL AREAS

1. OBSERVING GENERAL SAFETY PRECAUTIONS FOR WORKING IN THE LOCAL FEED MILL
 - A. OBSERVING SAFETY PRECAUTIONS TO PREVENT FIRES IN THE FEED MILL

- B. OBSERVING SAFETY PRECAUTIONS IN USING ELECTRICAL EQUIPMENT AND ELECTRICAL OUTLETS
- C. OBSERVING SAFETY PRECAUTIONS REGARDING PERSONAL DRESS FOR WORKING AROUND FEED MILL EQUIPMENT
- D. OBSERVING SAFETY PRECAUTIONS IN OPERATING VARIOUS ITEMS OF EQUIPMENT USED IN THE FEED MILL SUCH AS:
 - (1) AUGERS
 - (2) CONVEYORS
 - (3) MIXERS
 - (4) HAMMER MILL
 - (5) CRIMPER
 - (6) FORK LIFTS
 - (7) OTHER ITEMS OF FEED PREPARATION AND WAREHOUSING EQUIPMENT FOUND IN LOCAL FEED FIRMS

2. MAINTAINING THE FEED PREPARATION EQUIPMENT

A. CLEANING THE EQUIPMENT

- (1) REMOVING EXCESSIVE DUST
- (2) REMOVING EXCESS GREASE AND OIL
- (3) REMOVING OTHER DEBRIS FROM THE EQUIPMENT AND THE SURROUNDING AREA

3. PREPARING THE FEED MIXTURE USING APPROPRIATE EQUIPMENT

A. LOCATING THE APPROPRIATE INGREDIENTS CALLED FOR IN THE FEED MIXTURE

B. WEIGHING THE PROPER AMOUNT OF INGREDIENTS NEEDED

C. PREPARING THE VARIOUS INGREDIENTS IN THE PROPER FORM SUCH AS SHELLING CORN, ROLLING OR CRIMPING OATS, CRACKING CORN

- (1) ADJUSTING THE EQUIPMENT TO BE USED
- (2) CONVEYING THE INGREDIENTS TO THE APPROPRIATE EQUIPMENT FOR SPECIAL PREPARATION
- (3) OPERATING THE SPECIFIC EQUIPMENT ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS REGARDING SPEED AND VOLUME
- (4) CONVEYING THE VARIOUS INGREDIENTS FROM THE SPECIALIZED EQUIPMENT TO THE MIXER

D. MIXING THE VARIOUS INGREDIENTS INTO ONE FEED MIXTURE

- (1) DETERMINING WHEN TO ADD VARIOUS INGREDIENTS TO THE FEED MIXTURE

(2) DETERMINING HOW LONG TO MIX THE INGREDIENTS

4. DRAWING OFF THE PREPARED FEED

- A. ELEVATING THE MIXTURE TO A BULK TRUCK FOR DELIVERY
- B. ELEVATING THE MIXTURE TO BULK STORAGE AREAS
- C. BAGGING AND TYPING THE FEED FOR DELIVERY
- D. BAGGING, TYPING, AND TIEING THE FEED MIXTURE FOR WAREHOUSE STORAGE

5. CLEANING THE EQUIPMENT USED FOR PREPARING THE FEED MIXTURE

- A. CLEANING THE EQUIPMENT USED
- B. CLEANING THE FLOOR AREA AROUND THE EQUIPMENT USED

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. USING A PLATFORM SCALES, HAVE THE STUDENTS WEIGH PRECISE AMOUNTS OF VARIOUS INGREDIENTS THAT ARE TO BE INCLUDED IN A FEED MIXTURE. THESE INGREDIENTS MAY CONSIST OF SUCH ITEMS AS MOLASSES, SALT, AND TRACE MINERALIZED SALT.
- 2. HAVE THE STUDENTS TOUR A LOCAL FEED MILL AND CONDUCT A SAFETY CHECK TO IDENTIFY POTENTIAL SAFETY HAZARDS OBSERVED.
- 3. HAVE THE STUDENTS OPERATE VARIOUS ITEMS OF EQUIPMENT WHILE EMPLOYED IN A FEED MILL BEING SURE TO OBSERVE OPERATING DIRECTIONS DETAILED IN THE OPERATOR'S MANUALS.
- 4. HAVE THE STUDENTS CHANGE SCREENS IN THE HAMMER MILL WHILE THEY ARE EMPLOYED IN A FEED MILL.
- 5. HAVE THE STUDENTS CONVEY THE FEED MIXTURE INTO A BULK TRUCK WHILE THE STUDENTS ARE EMPLOYED IN A FEED MILL.
- 6. HAVE THE STUDENTS DRAW OFF PREPARED FEED INTO BURLAP BAGS AND PRACTICE TYING MILLER'S KNOTS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

- 1. HAVE THE STUDENTS WEIGH A SPECIFIC AMOUNT OF AN INGREDIENT THAT IS CALLED FOR IN A RATION, SUCH AS SALT, WITH A TOLERANCE OF $\pm .5\%$.

2. HAVE THE STUDENTS CHECK THE ELECTRICAL CORDS IN EQUIPMENT FOR DEFECTS SUCH AS BELT CONVEYORS AND DETERMINE IF THE CORD HAS DEFECTS OR DOES NOT HAVE DEFECTS.
3. HAVE THE STUDENTS OPERATE THE VARIOUS EQUIPMENT SUCH AS A HAMMER MILL OR FEED MIXER AND EVALUATE THE STUDENTS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS REGARDING SPEED AND VOLUME.
4. HAVE THE STUDENTS SELECT THE PROPER SCREEN TO BE USED IN THE HAMMER MILL FOR A SPECIFIED JOB AND INSTALL THE SCREEN. EVALUATE THE STUDENTS BY DETERMINING WHETHER THE PROPER SCREEN WAS INSTALLED ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS.
5. HAVE THE STUDENTS ELEVATE BULK FEED FROM THE MIXER TO A SPECIFIED STORAGE AREA. EVALUATE THE STUDENT BY CONSIDERING WHETHER THE FEED IS STORED IN THE APPROPRIATE BIN.
6. HAVE THE STUDENTS BAG FEED BY DRAWING THE MIXTURE FROM THE MIXER INTO BURLAP BAGS AND TYING A MILLER'S KNOT IN FIVE SECONDS OR LESS.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. ACCESS TO COOPERATIVE WORK STATIONS IN FEED MILLS
2. SAFETY CHECK LISTS
3. "SAFE" AND "UNSAFE" CORDS ON ELECTRIC MOTORS FOR THE STUDENTS TO EXAMINE
4. PLATFORM SCALES
5. BURLAP BAGS
6. TWINE
7. GREASE GUNS AND GREASE
8. OPERATOR'S MANUALS FOR THE EQUIPMENT IN THE FEED FIRM
9. OIL AND OIL CANS
10. SMALL HAND TOOLS SUCH AS PLIERS, WRENCHES AND SCREW-DRIVERS FOR MAKING MINOR REPAIRS AND ADJUSTMENTS

F. EXAMPLES OF SUPPORTING REFERENCES

1. GOOD FEED MIXING PRACTICES. LAFAYETTE, INDIANA: COOPERATIVE EXTENSION SERVICE, PURDUE UNIVERSITY. PP. 1-5..

A STUDENT REFERENCE THAT COVERS IN A VERY GENERAL NATURE THE PROCEDURES OF MIXING FEEDS, IT COVERS SUCH TOPICS AS BUILDINGS AND HOUSEKEEPING, WEIGHING, SEQUENCING OF INGREDIENT ADDITION TO THE MIXER, PRE-MIXING, MIXER CLEAN-OUT AND MIXED FEED STORAGE.

2. OPERATOR'S MANUALS FROM MANUFACTURERS FOR THE VARIOUS ITEMS OF EQUIPMENT.

THESE PUBLICATIONS WILL INCLUDE GENERAL MAINTENANCE AND ADJUSTMENT PROCEDURES FOR THE SPECIFIC ITEMS OF EQUIPMENT THAT THE STUDENT WILL FIND USEFUL WHEN WORKING ON THE EQUIPMENT.

3. PERRY, T. S. FEED FORMULATION HANDBOOK. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1971, PP. 205-212.

IN SEVERAL PAGES, THIS REFERENCE COVERS IN GENERAL TERMS PRECAUTIONS THAT THE FEED MILL EMPLOYEE MAY NEED TO TAKE TO LIMIT THE INCLUSION OF METAL BITS IN THE FEED. A SPECIALIZED SECTION IS INCLUDED WHICH DISCUSSES THE IMPORTANCE OF KEEPING THE MILL CLEAN TO PREVENT DUST EXPLOSIONS. ADDITIONAL SECTIONS COVER THE IMPORTANCE OF CONTROLLING RATS AND INSECTS THAT MAY BECOME A PROBLEM WHERE FEED IS STORED AND PREPARED.

PICKING UP HOME-GROWN FEED INGREDIENTS AND DELIVERING FEED

UNIT CONCEPT: THE STUDENT EMPLOYED BY A FEED FIRM WHO CAN PICK UP FEED INGREDIENTS AT THE HOME FARM TO BE USED BY THE FIRM IN PREPARING FEED AND DELIVER THE COMPLETE PREPARED FEED TO THE CUSTOMER IN THE FORM DESIRED AND ON TIME WILL ASSIST IN DEVELOPING SATISFIED CUSTOMERS WHO WILL CONTINUE TO SEEK THE SERVICES OF THAT FEED FIRM.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. PERFORM MINOR LUBRICATION AND MAINTENANCE TASKS ON THE BULK FEED TRUCK, FLAT-BED FEED TRUCK OR PICK-UP TRUCK ACCORDING TO THE DIRECTIONS IN THE OPERATOR'S MANUALS.
2. FOLLOW INSTRUCTIONS IN ASSISTING TO PICK UP INGREDIENTS FROM THE CUSTOMER'S FARM FOR USE IN PREPARING A COMPLETE FEED TO THE SATISFACTION OF THE EMPLOYER AND CUSTOMER.
3. CORRECTLY WEIGH AMOUNTS OF INGREDIENTS USING THE TRUCK SCALES OR BY ESTIMATING WITH A SPECIFIED VOLUME MEASURE.
4. LOAD THE BULK TRUCK AT THE FEED MILL AND UNLOAD THE BULK TRUCK AT THE CUSTOMER'S FARM ACCORDING TO PROCEDURES DESCRIBED IN THE OPERATOR'S MANUAL OR AS DESCRIBED BY THE EMPLOYER.
5. LOAD AND UNLOAD BAGGED FEED EITHER MANUALLY AND/OR BY USING BELT CONVEYORS ACCORDING TO THE DIRECTIONS IN THE OPERATOR'S MANUAL FOR THE BELT CONVEYOR OR AS DIRECTED BY THE EMPLOYER.
6. CORRECTLY COMPLETE APPROPRIATE PICK-UP AND/OR DELIVERY FORMS USED BY THE LOCAL FEED MILL FOR FEED DELIVERIES.

B. INSTRUCTIONAL AREAS

1. MAINTAINING EQUIPMENT USED TO PICK UP AND DELIVER FEED
 - A. CHECKING THE AMOUNT OF FUEL IN THE TANK OF THE TRUCK AND FILLING THE TANK WITH GAS
 - B. CHECKING THE OIL LEVEL IN THE ENGINE AND ADDING OIL

- C. PERFORMING MINOR LUBRICATION TASKS
 - (1) GREASING SUCH PARTS AS THE TRUCK SPRINGS, THE DRIVE SPROCKETS AND CONVEYORS
 - (2) OILING SUCH PARTS AS CHAINS AND PULLEYS
- D. CHECKING THE WATER LEVEL IN THE TRUCK AND ADDING WATER
- E. CHECKING THE BATTERY WATER LEVEL AND ADDING WATER
- F. CHECKING TIRE PRESSURE AND PUTTING AIR IN THE TIRES
- G. CHECKING THE BRAKE FLUID LEVEL AND ADDING FLUID
- 2. PICKING UP INGREDIENTS AT THE CUSTOMER'S FARM TO BE USED IN PREPARING COMPLETE FEEDS
 - A. GENERAL PROCEDURES AND COURTESIES TO FOLLOW WHEN PICKING UP FEEDS
 - B. LOCATING THE INGREDIENTS TO BE PICKED UP FOR USE IN PREPARING A COMPLETE FEED
 - (1) IDENTIFICATION OF COMMON FARM-GROWN PRODUCTS USED IN FORMULATING COMPLETE FEEDS
 - (2) DETERMINING THE EASIEST METHOD AND PROPER PROCEDURES FOR LOADING THE INGREDIENTS
 - C. LOADING THE INGREDIENTS EITHER MANUALLY OR BY USING GRAIN ELEVATORS OR CONVEYORS
 - D. ESTIMATING THE AMOUNT OF INGREDIENTS BY USING VOLUME MEASURES
- 3. WEIGHING THE AMOUNT OF INGREDIENTS ON A TRUCK BY USING THE TRUCK SCALES
 - A. GETTING THE SCALES READY FOR WEIGHING
 - B. DETERMINING GROSS WEIGHT
 - C. DETERMINING NET WEIGHT
 - D. WRITING UP THE SCALE TICKET
- 4. UNLOADING THE HOME-GROWN PRODUCTS AT THE FEED MILL
 - A. UNLOADING BAGGED INGREDIENTS PICKED UP AT THE FARM
 - B. UNLOADING BULK QUANTITIES PICKED UP AT THE FARM

- (1) SAFETY PRECAUTIONS TO BE OBSERVED WHEN WORKING AROUND THE DUMPING AREA
 - (2) UNLOADING THE INGREDIENTS FROM EITHER A PICK-UP TRUCK OR A DUMP FEED TRUCK
 - (3) OPERATING THE AUGERS IN THE DUMPING AREA
5. LOADING THE TRUCKS FOR DELIVERING FEED TO THE CUSTOMERS
- A. PROCEDURES AND PRECAUTIONS TO OBSERVE IN LOADING THE BULK FEED TRUCK
 - B. PROCEDURES AND PRECAUTIONS TO OBSERVE IN LOADING BAGGED FEED ON A TRUCK BY USING BELT CONVEYORS
 - C. PROCEDURES AND PRECAUTIONS TO OBSERVE WHEN LOADING BAGGED FEED MANUALLY
 - (1) PROPER PROCEDURES FOR LIFTING BAGGED FEED TO PREVENT PERSONAL INJURY
 - (2) METHODS OF CARRYING BAGGED FEED
 - D. LOADING THE BAGGED FEED IN THE PROPER ORDER FOR EASE IN DELIVERING AND UNLOADING THE FEED
 - (1) DETERMINING THE DELIVERY ROUTE SEQUENCE TO FOLLOW
 - (2) LOADING THE FEED IN THE PROPER ORDER TO ALLOW FOR EASE IN DELIVERING AND UNLOADING ACCORDING TO THE DELIVERY SEQUENCE
6. DELIVERING THE FEED TO THE CUSTOMER
- A. GENERAL PROCEDURES AND COURTESIES TO FOLLOW WHEN DELIVERING FEEDS TO THE CUSTOMER
 - B. UNLOADING THE BULK TRUCK AT THE FARM
 - C. UNLOADING BAGGED FEED EITHER MANUALLY OR BY USING BELT CONVEYORS
 - D. COMPLETING APPROPRIATE DELIVERY FORMS USED BY THE FIRM

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS PERFORM THE MINOR LUBRICATION AND MAINTENANCE TASKS ON A BULK TRUCK, ON A FLAT-BED FEED TRUCK AND ON A CONVEYOR OR ELEVATOR.
2. HAVE THE STUDENTS ASSIST IN PICKING UP FARM-GROWN PRODUCTS TO BE USED IN PREPARING A COMPLETE FEED.

3. A. HAVE THE STUDENTS USE A PLATFORM SCALES, SHOVEL AND VARIOUS KINDS OF GRAIN TO DETERMINE THE AVERAGE WEIGHT OF A SHOVEL OF CORN, OATS AND WHEAT. CALCULATE THE NUMBER OF SHOVELFULS THAT WOULD BE REQUIRED TO MAKE AN APPROXIMATE AMOUNT OF CORN, OATS OR WHEAT.

B. HAVE THE STUDENTS WEIGH INGREDIENTS PICKED UP AT THE FARM WITH A TRUCK BY USING A TRUCK SCALES. THE STUDENTS SHOULD CALCULATE THE AMOUNT OF GRAIN ON THE TRUCK AND WRITE UP A SCALE TICKET.
4. HAVE THE STUDENTS LOAD THE BULK TRUCK AT THE LOCAL FEED MILL AND HELP UNLOAD THE BULK TRUCK AT THE CUSTOMER'S FARM.
5. HAVE THE STUDENTS LOAD BAGGED FEED ON A FEED TRUCK IN THE PROPER SEQUENCE SO THE FEED CAN BE DELIVERED ACCORDING TO A SPECIFIED DELIVERY ROUTE SEQUENCE.
6. HAVE THE STUDENTS COMPLETE THE APPROPRIATE DELIVERY FORMS USED BY THE LOCAL FEED FIRM.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. HAVE THE STUDENTS PERFORM THE MINOR MAINTENANCE LUBRICATION TASKS ON A BULK FEED TRUCK ACCORDING TO THE INSTRUCTIONS IN THE OPERATOR'S MANUAL.
2. WHILE PLACED IN A COOPERATIVE WORK STATION, ASSIST IN PICKING UP INGREDIENTS AT THE CUSTOMER'S FARM TO THE SATISFACTION OF THE EMPLOYER.
3. PRESENT THE STUDENTS WITH A CASE PROBLEM WITH THE NECESSARY INFORMATION INCLUDING TARE WEIGHT, GROSS WEIGHT AND THE INGREDIENTS WEIGHED. HAVE THE STUDENTS CORRECTLY COMPLETE A SCALE TICKET BEING CERTAIN THAT CORRECT NET WEIGHT IS CALCULATED.
4. WHILE PLACED IN A COOPERATIVE WORK STATION, HAVE THE STUDENTS LOAD A BULK TRUCK ACCORDING TO THE DIRECTIONS OF THE EMPLOYER.
5. USING BAGS OF FEED AND A PICK-UP TRUCK, HAVE THE STUDENTS MANUALLY LOAD BAGGED FEED FOR DELIVERY BEING CERTAIN TO LOAD THE FEED SUCH THAT A DESCRIBED DELIVERY SEQUENCE MAY BE FOLLOWED. EVALUATE THE STUDENTS BY CONSIDERING THE PROCEDURES THEY FOLLOW IN LIFTING AND CARRYING THE BAGS.

6. PRESENT THE STUDENTS WITH THE APPROPRIATE FORMS AND THE NECESSARY INFORMATION REGARDING THE DELIVERY OF FEED. HAVE THE STUDENTS ACCURATELY COMPLETE THE DELIVERY FORM.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. ACCESS TO GRAIN, SHOVELS, A PLATFORM SCALES, CONVEYOR BELT AND BAGGED FEED
2. TRUCKS FOR THE STUDENTS TO SERVICE
3. SERVICE MANUALS FOR THE TRUCKS AND CONVEYOR BELT
4. TRUCK SCALES
5. FORMS USED BY THE LOCAL FEED FIRM

F. EXAMPLES OF SUPPORTING REFERENCES

1. OPERATOR'S MANUALS FOR THE TRUCK SCALES.

THESE WILL INCLUDE APPROPRIATE OPERATION AND MAINTENANCE PROCEDURES.

2. SERVICE AND OPERATOR'S MANUALS FOR THE TRUCKS AND OTHER EQUIPMENT

THESE REFERENCES WILL BE ESPECIALLY HELPFUL FOR PERFORMING MINOR LUBRICATION TASKS AND OTHER MAINTENANCE TASKS ON THE TRUCKS AND CONVEYORS.

WAREHOUSING FEED

UNIT CONCEPT: THE LOCAL FEED MILL GENERALLY HAS STORAGE FACILITIES OR WAREHOUSES WHERE INGREDIENTS TO BE USED IN FORMULATING COMPLETE FEEDS OR COMPLETE MIXED FEEDS ARE STORED. THE EMPLOYEE WHO CAN ASSIST IN PROPERLY STORING COMPLETE FEEDS OR FEED INGREDIENTS WILL ASSIST IN REDUCING LOSSES DUE TO DAMAGE OF PRODUCTS BY RODENTS, MOISTURE AND OTHER FACTORS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN WORKING IN THE FEED FIRM, PREPARE STORAGE AREAS FOR STORAGE OF FEEDS OR FEED INGREDIENTS BY CLEANING THE STORAGE AREA ACCORDING TO THE DIRECTIONS OF THE EMPLOYER AND FOLLOWING APPROVED RODENT CONTROL PROCEDURES.
2. WHEN WORKING IN THE FEED FIRM, OPERATE FORK LIFTS AND OTHER EQUIPMENT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS TO MOVE FEED AND FEED INGREDIENTS INTO OR FROM THE STORAGE AREA.

B. INSTRUCTIONAL AREAS

1. PREPARING THE STORAGE AREAS
 - A. CLEANING THE DEBRIS FROM THE STORAGE AREAS - BULK BINS AND FLOOR SPACE
 - B. USING APPROVED RODENT CONTROL PROCEDURES
2. STORING THE INGREDIENTS TO BE USED IN FORMULATING MIXED FEEDS
 - A. FACTORS TO BE CONSIDERED IN STORING INGREDIENTS TO BE USED IN FORMULATING FEEDS
 - (1) THE RATE AT WHICH THE PRODUCT IS USED
 - (2) THE AMOUNT OF MATERIAL TO BE STORED
 - (3) SEASONAL DEMANDS FOR THE PRODUCT
 - (4) PHYSICAL CONDITIONS IN THE STORAGE AREA WHICH WILL INFLUENCE THE SELECTION OF A STORAGE SITE
 - (5) OTHER FACTORS UNIQUE TO EACH LOCAL FEED FIRM

- B. STORING THE PRODUCTS AND COMPLETING AND FILING APPROPRIATE FORMS AS MATERIALS ARE TAKEN IN AND TAKEN OUT OF THE STORAGE AREAS
 - C. DETERMINING HOW MUCH MATERIAL IS LEFT IN THE STORAGE AREAS
 - (1) CHECKING INVENTORY RECORDS
 - (2) ESTIMATING THE AMOUNT OF MATERIALS BY VOLUME
3. STORING MIXED FEEDS
- A. FACTORS TO CONSIDER IN SELECTING APPROPRIATE STORAGE AREAS FOR BULK OR BAGGED MIXED FEED QUANTITIES
 - (1) RATE AT WHICH THE FEED WILL BE SOLD
 - (2) AMOUNT OF FEED TO BE STORED
 - (3) PHYSICAL CONDITIONS IN THE STORAGE AREA
 - (4) OTHER FACTORS TO BE CONSIDERED BY LOCAL FIRMS
 - B. MAKING SURE THAT THE MIXED FEEDS ARE LABELED PROPERLY WHETHER THEY BE STORED IN BULK OR BAG QUANTITIES
 - C. DETERMINING HOW MUCH MIXED FEED IS ON HAND
 - (1) CHECKING INVENTORY RECORDS
 - (2) ESTIMATING THE AMOUNT OF FEED BY VOLUME
4. OPERATING THE VARIOUS ITEMS OF EQUIPMENT USED IN THE WAREHOUSE AREA
- A. VARIOUS EQUIPMENT USED IN THE WAREHOUSE TO MOVE FEED AND FEED INGREDIENTS
 - (1) FORK LIFTS
 - (2) CONVEYORS AND ELEVATORS
 - (3) AUGERS
 - (4) HAND TRUCKS
 - (5) OTHER EQUIPMENT USED BY THE LOCAL FEED MILLS
 - B. FOLLOWING PROPER AND SAFE OPERATING PROCEDURES WHEN USING SUCH EQUIPMENT
 - C. PERFORMING MINOR MAINTENANCE ON SUCH EQUIPMENT
 - (1) PERFORMING APPROPRIATE LUBRICATION REQUIREMENTS
 - (2) PERFORMING MINOR MAINTENANCE AND ADJUSTMENT REQUIREMENTS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS CLEAN FEED STORAGE AREAS AND PREPARE BULK BINS FOR STORAGE OF MIXED FEEDS.
2. HAVE THE STUDENTS OPERATE FORK LIFTS TO TRANSFER BAGGED FEED INGREDIENTS WHICH HAVE BEEN STACKED ON PALLETS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. WHILE WORKING IN THE FEED MILL, HAVE THE STUDENTS CLEAN AND PREPARE BULK STORAGE BINS TO THE SATISFACTION OF THE EMPLOYER.
2. HAVE THE STUDENTS OPERATE A FORK LIFT TO PICK UP, TRANSPORT AND UNLOAD A PALLET OF BAGGED FEED INGREDIENTS SUCH AS SUPPLEMENTS. EVALUATE THE STUDENTS BY CONSIDERING WHETHER SAFE OPERATING PROCEDURES WERE FOLLOWED AS DETAILED IN THE FORK LIFT OPERATOR'S MANUAL AND WHETHER THE BAGS WERE SPILLED FROM THE PALLET OR TORN OPEN.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. ACCESS TO A COOPERATIVE WORK STATION IN A LOCAL FEED MILL WHICH HAS A WAREHOUSE AREA
2. SAMPLES OF VARIOUS PRODUCTS THAT MAY BE USED TO CLEAN AND DISINFECT STORAGE AREAS
3. SAMPLES OF PRODUCTS USED TO CONTROL RODENTS
4. FORMS USED FOR RECEIVING MATERIALS INTO THE WAREHOUSE
5. STEEL TAPES TO BE USED IN DETERMINING VOLUME
6. CHARTS SHOWING THE VOLUME MEASURE FOR VARIOUS INGREDIENTS SUCH AS CORN, OATS
7. FORK LIFT
8. PALLETS
9. BAGGED FEED OR FEED INGREDIENTS
10. GREASE, OIL AND GREASE GUN

F. EXAMPLES OF SUPPORTING REFERENCES

1. OPERATOR'S MANUALS FOR THE VARIOUS PIECES OF EQUIPMENT.

THESE REFERENCES WILL INCLUDE APPROPRIATE MAINTENANCE, LUBRICATION AND ADJUSTMENT PROCEDURES FOR THE EQUIPMENT. IN ADDITION, THESE MANUALS GENERALLY INCLUDE SAFE OPERATING PROCEDURES FOR THE EQUIPMENT.

2. WILLS, WALTER J. AN INTRODUCTION TO AGRIBUSINESS MANAGEMENT. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1973, PP. 63-71.

INCLUDED IN THIS REFERENCE ARE TOPICS ON WAREHOUSING WHICH DEAL WITH STORAGE AND QUALITY, STORAGE AND SAFETY, HORIZONTAL AND VERTICAL STORAGE, BULK AND PACKAGED PRODUCTS, WAREHOUSE DESIGN AND SIZE OF WAREHOUSE.

REGULATIONS IN FORMULATING AND LABELING FEED

UNIT CONCEPT: THE PERSON EMPLOYED IN THE FEED MILL OR FEED STORE WHO CAN LOCATE AND INTERPRET MANUFACTURER RECOMMENDATIONS AND STATE AND FEDERAL LAWS AND REGULATIONS WILL ASSIST THE EMPLOYER IN MEETING STATE OPERATING LICENSING REQUIREMENTS BY PROPER LABELING OF FEEDS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PROVIDED WITH A FEED TAG, CORRECTLY INTERPRET ALL INFORMATION CONTAINED ON THAT TAG.
2. WHILE PREPARING FEED IN THE FEED MILL, LOCATE APPROPRIATE STATE AND FEDERAL LEGAL INFORMATION REGARDING THE LABELING OF FEED IN BAGS OR BULK AND LABEL SUCH QUANTITIES OF FEED ACCORDING TO THE REGULATIONS AND LOCAL FEED MILL POLICIES.
3. WHEN GIVEN APPROPRIATE FORMULATION INFORMATION FOR MEDICATED FEEDS AND USING APPROPRIATE STATE AND FEDERAL REGULATIONS, ACCURATELY COMPLETE THE SALES SLIP FOR A CUSTOMER BY CHECKING THE APPROPRIATE AREAS.
4. WHEN GIVEN APPROPRIATE STATE AND FEDERAL REGULATIONS CONCERNING COMMERCIAL FEED DRUG ADDITIVES, LOCATE AND STATE THE PENALTIES THAT MAY BE LEVIED AGAINST A FIRM FOR VIOLATION OF A SPECIFIC LAW OR REGULATION AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.

B. INSTRUCTIONAL AREAS

1. LABELING OF FEEDS

A. DETERMINING WHAT INFORMATION IS REQUIRED BY LAW FOR LABELING FEEDS

- (1) LOCATING VARIOUS SOURCES WHICH CONTAIN RULES AND REGULATIONS FOR LABELING FEED
- (2) INTERPRETING THE RULES AND REGULATIONS FOR LABELING

B. INTERPRETING THE INFORMATION THAT IS CONTAINED ON THE FEED TAG

- (1) NET WEIGHT OF THE CONTENTS
- (2) PRODUCT NAME, BRAND NAME, IF ANY
- (3) NAME AND ADDRESS OF LICENSEE
- (4) PURPOSE OF MEDICATION AND ADDITIVE
- (5) ACTIVE DRUG INGREDIENTS
- (6) GUARANTEED ANALYSIS OF FEED
- (7) FEED INGREDIENTS EXPRESSED BY THEIR COMMON NAME
- (8) DETAILED FEEDING DIRECTIONS

- (A) PURPOSE
- (B) WHEN TO FEED
- (C) HOW TO FEED
- (D) PRECAUTIONS FOR USE
- (E) WARNING STATEMENT

- (9) OTHER SPECIFICS REQUIRED BY THE VARIOUS STATES

C. LABELING FEEDS PRODUCED BY THE LOCAL MILL

- (1) DETERMINING WHAT INFORMATION IS REQUIRED TO BE PUT ON THE LABEL OR TAG
- (2) USING LOCAL EQUIPMENT AND LABELS OR TAGS TO LABEL BULK OR BAGGED FEEDS IN STORAGE OR SHIPMENT

2. IDENTIFYING FEDERAL AND STATE REGULATIONS AND RULES THAT PERTAIN TO THE SPECIFIC MIXING AND PREPARATION OF CUSTOMER-FORMULA FEEDS

A. RULES AND REGULATIONS THAT PERTAIN TO THE ADDITION OF ADDITIVES

- (1) IDENTIFYING LOCAL FEED FIRM POLICIES FOR MIXING ADDITIVES WITH FEEDS
- (2) DETERMINING WHAT ADDITIVES MAY LEGALLY BE ADDED

B. COMPLETING APPROPRIATE FORMS WHEN ADDITIVES SUCH AS MEDICATION ARE USED

- (1) PROPERLY AND ACCURATELY COMPLETING THE SALES SLIP OR INVOICE
- (2) PROPERLY AND ACCURATELY COMPLETING THE PRODUCT INFORMATION SHEET TO BE GIVEN THE CUSTOMER

C. DETERMINING WHAT PENALTIES MAY BE INVOKED WHEN THE FEED FIRM DOES NOT ADHERE TO THE SPECIFIC RULES AND REGULATIONS

3. IDENTIFYING STATE AND FEDERAL REGULATIONS THAT PERTAIN TO THE OPERATION OF THE FEED MILL

- A. IDENTIFYING REGULATIONS AND LAWS THAT PERTAIN TO LICENSING
 - (1) LICENSING REQUIRED IN EACH STATE FOR FEED OPERATIONS
 - (2) EXPIRATION AND RENEWAL PROCEDURES FOR LICENSING
- B. IDENTIFYING REGULATIONS AND LAWS THAT PERTAIN TO SAMPLING
 - (1) PURPOSES OF SAMPLING AND INSPECTION
 - (2) SAMPLING AND ANALYZING FEED BY A LICENSED INSPECTOR
- C. IDENTIFYING THE REGULATIONS AND LAWS THAT PERTAIN TO THE TYPES OF RECORDS TO BE KEPT BY LOCAL FEED FIRMS
 - (1) REGULATIONS REGARDING FORMULA AND PRODUCTION RECORDS
 - (2) REGULATIONS REGARDING DRUG INVENTORY RECORDS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. USING FEED TAGS COLLECTED BY THE CLASS, HAVE THE STUDENTS INTERPRET THE INFORMATION CONTAINED ON THE FEED LABEL OR FEED TAG.
- 2. HAVE THE STUDENTS PREPARE FEED TAGS OR LABELS WHICH ARE TO BE ATTACHED TO STORED BAGGED FEED PRODUCED BY THE LOCAL FEED MILL.
- 3. HAVE THE STUDENTS COMPLETE SALES INVOICES AND PRODUCT INFORMATION SHEETS FOR MEDICATED FEEDS THAT HAVE BEEN PREPARED FOR A LOCAL FARMER
- 4. HAVE THE STUDENTS USE COPIES OF STATE AND FEDERAL RULES AND REGULATIONS TO DETERMINE WHAT PENALTIES MAY BE INVOKED AGAINST THE LOCAL FIRM SHOULD IT VIOLATE RULES AND REGULATIONS REGARDING THE ADDITION OF MEDICATIONS TO FEED MIXTURES.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

- 1. PRESENT THE STUDENTS WITH SAMPLES OF FEED TAGS OR LABELS AND HAVE THE STUDENTS ACCURATELY DETERMINE:
 - A. THE NET WEIGHT OF THE CONTENTS
 - B. PRODUCT NAME

C. BRAND NAME

D. GUARANTEED MINIMUM ANALYSIS FOR CRUDE PROTEIN, CRUDE FAT AND CRUDE FIBER

E. FEED INGREDIENTS

2. PRESENT THE STUDENTS WITH THE NECESSARY INFORMATION REGARDING THE MIXING OF A FEED BY A LOCAL FIRM, FEED TAGS TO BE COMPLETED, AND FELT TIP PENS. HAVE THE STUDENTS ACCURATELY COMPLETE THE FEED TAG AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
3. PRESENT THE STUDENTS WITH APPROPRIATE INFORMATION REGARDING A MEDICATED FEED MIXTURE THAT WAS PREPARED AND SOLD TO A LOCAL FARMER AND A PRODUCT INFORMATION SHEET. HAVE THE STUDENTS ACCURATELY COMPLETE A PRODUCT INFORMATION SHEET AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
4. PRESENT THE STUDENTS WITH A CASE STUDY WHICH INVOLVES A VIOLATION OF STATE AND FEDERAL REGULATIONS BY A LOCAL FEED FIRM. USING APPROPRIATE REGULATIONS AND RULES INFORMATION, HAVE THE STUDENTS WRITE THE PENALTIES THAT MAY BE INVOKED AGAINST THE LOCAL FEED FIRM AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. COPIES OF PRODUCT INFORMATION BULLETINS AND MANUALS
2. COPIES OF STATE AND FEDERAL RULES AND REGULATIONS
3. COPIES OF SALES INVOICES
4. COPIES OF PRODUCT INFORMATION SHEETS
5. VARIOUS FEED TAGS AND LABELS
6. COPIES OF BLANK FEED TAGS

F. EXAMPLES OF SUPPORTING REFERENCES

1. OHIO COMMERCIAL FEED LAW. CONTACT STATE ASSOCIATION FOR THE SPECIFIC FEED LAWS IN THE STATE.

THESE LAWS GENERALLY WILL COVER SUCH AREAS AS LICENSING, SAMPLING AND ANALYSIS, LABELING, MISBRANDING AND THE VARIOUS PENALTIES ASSOCIATED WITH THE BREAKING OF SUCH RULES AND REGULATIONS.

2. TRADE RULES OF THE GRAIN AND FEED DEALERS NATIONAL ASSOCIATION. CURRENT EDITION. WASHINGTON, D.C.: NATIONAL GRAIN AND FEED ASSOCIATION.

IN SOME CASES, THESE GENERAL RULES HAVE BEEN ADAPTED TO THE SPECIFIC STATES BY THE STATE ASSOCIATIONS. THESE RULES COVER SUCH AREAS AS SHIPPING, LABELING, CONTRACTS AND PACKAGING. IT IS RECOMMENDED THAT COPIES OF THE RULES OF THE NATIONAL ASSOCIATION OF GRAIN AND FEED DEALERS AND OF THE STATE ASSOCIATION BE OBTAINED FOR STUDENTS TO REVIEW.

3. PLANK, HARRY. FEEDS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, PP. 64-75.

A STUDENT REFERENCE AND WORKBOOK, VARIOUS TOPICS ARE COVERED WHICH DEAL WITH LICENSING, LABELING AND REGULATIONS PERTAINING TO THE USE OF DRUGS IN FEEDS. SEVERAL EXERCISES ARE INCLUDED FOR THE STUDENTS TO COMPLETE.

III

FERTILIZERS

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UTILIZATION OF FERTILIZER AND LIME MATERIALS

DETERMINING FERTILIZER AND LIME NEEDS

APPLYING FERTILIZER AND LIME MATERIALS

HANDLING AND STORING FERTILIZERS

UTILIZATION OF FERTILIZER AND LIME MATERIALS

UNIT CONCEPT: THE EMPLOYEE IN THE FERTILIZER AND LIME INDUSTRY WHO IS AWARE OF HOW PLANTS UTILIZE FERTILIZER MATERIALS AND THE NUTRIENT REQUIREMENTS OF VARIOUS PLANTS WILL BE ABLE TO ASSIST CUSTOMERS IN DETERMINING WHAT FERTILIZERS AND LIMES ARE APPROPRIATE FOR APPLICATION.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PRESENTED A CASE PROBLEM, LIST OR DESCRIBE THREE REASONS WHY IT IS IMPORTANT FOR THE FARMER TO FOLLOW APPROPRIATE FERTILIZATION AND LIME PRACTICES.
2. WHEN PRESENTED A LIST OF THE ESSENTIAL ELEMENTS, CORRECTLY IDENTIFY THE PRIMARY AND SECONDARY NUTRIENTS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER AND DETERMINE WHETHER THE NUTRIENTS ARE SUPPLIED BY LIME OR FERTILIZER MATERIALS.
3. WHEN PRESENTED A PROBLEM REQUIRING THE APPLICATION OF FERTILIZER SUPPLIED NUTRIENTS, LIST TWO SOURCES WHICH MAY SUPPLY THE NUTRIENTS.

B. INSTRUCTIONAL AREAS

1. DETERMINING THE IMPORTANCE OF SUPPLYING APPROPRIATE ELEMENTS TO PLANTS
 - A. DETERMINING THE RELATIONSHIP BETWEEN APPROPRIATE LIME AND FERTILIZATION PROGRAMS AND CROP YIELDS
 - B. DETERMINING THE RELATIONSHIP BETWEEN THE AVAILABILITY OF NUTRIENTS AND PLANT GROWTH
 - C. DETERMINING THE RELATIONSHIP BETWEEN THE AVAILABILITY OF NUTRIENTS AND THE NUTRITIVE VALUE OF PLANTS AND CROPS
 - D. DETERMINING THE RELATIONSHIP BETWEEN APPROPRIATE FERTILIZATION AND LIME PROGRAMS AND RELATIVE PRODUCTION COSTS AND RETURNS

- E. DETERMINING THE RELATIONSHIP BETWEEN FOLLOWING APPROPRIATE FERTILIZATION AND LIME PROGRAMS AND THE VALUE OF LAND AND THE BUILD-UP OF SOIL FERTILITY
- 2. IDENTIFYING THE ELEMENTS THAT ARE SUPPLIED BY FERTILIZERS AND LIMING MATERIALS
 - A. IDENTIFYING THE PRIMARY NUTRIENTS AND HOW THEY INFLUENCE PLANT GROWTH AND THE AVAILABILITY OF OTHER ELEMENTS
 - B. IDENTIFYING THE SECONDARY NUTRIENTS AND HOW THEY INFLUENCE PLANT GROWTH AND THE AVAILABILITY OF OTHER ELEMENTS
 - C. IDENTIFYING THE TRACE ELEMENTS OR MICRO-NUTRIENTS AND HOW THEY INFLUENCE PLANT GROWTH AND THE AVAILABILITY OF OTHER ELEMENTS
 - D. DETERMINING HOW VARIOUS FACTORS INFLUENCE THE USE OF NUTRIENTS
 - (1) SOIL STRUCTURE
 - (2) SOIL TEXTURE
 - (3) PH LEVEL
 - (4) ORGANIC MATTER
 - (5) BACTERIA
 - (6) PRESENCE OF OTHER NUTRIENTS
- 3. IDENTIFYING NUTRIENT DEFICIENCY SYMPTOMS IN PLANTS
 - A. DETERMINING THE CAUSES OF HUNGER SIGNS IN PLANTS
 - B. IDENTIFYING NITROGEN DEFICIENCY SYMPTOMS
 - C. IDENTIFYING PHOSPHORUS DEFICIENCY SYMPTOMS
 - D. IDENTIFYING POTASSIUM DEFICIENCY SYMPTOMS
- 4. DETERMINING WHAT FERTILIZER AND LIME MATERIALS ARE AVAILABLE TO SUPPLY THE NEEDED ELEMENTS
 - A. VARIOUS SOURCES AVAILABLE TO SUPPLY NITROGEN
 - B. VARIOUS SOURCES AVAILABLE TO SUPPLY PHOSPHORUS
 - C. VARIOUS SOURCES AVAILABLE TO SUPPLY POTASSIUM
 - D. VARIOUS SOURCES AVAILABLE TO SUPPLY THE SECONDARY ELEMENTS OF CALCIUM AND MAGNESIUM
 - E. VARIOUS SOURCES AVAILABLE TO SUPPLY THE TRACE ELEMENTS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS DISCUSS WITH A LOCAL FARMER THE IMPORTANCE OF CONTINUALLY FOLLOWING A "GOOD" FERTILIZATION AND LIME PROGRAM.
2. HAVE THE STUDENTS DEVELOP A CHART WHICH LISTS THE ESSENTIAL ELEMENTS BY VARIOUS GROUPS SUCH AS PRIMARY NUTRIENTS, SECONDARY ELEMENTS, AND TRACE ELEMENTS. INCLUDED IN THE CHART SHOULD BE A LISTING OF VARIOUS SOURCES WHICH MAY BE USED TO SUPPLY THE ELEMENTS.
3. HAVE THE STUDENTS ASSIGNED INTO GROUPS; SELECT THE PRIMARY NUTRIENTS AND DEVELOP A CLASS PRESENTATION WHICH COVERS THE VARIOUS SOURCES AVAILABLE TO SUPPLY THE NUTRIENTS AND WHEN VARIOUS SOURCES MAY BE USED.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. HAVE THE STUDENTS LIST THREE REASONS WHY A FARMER MAY FIND IT DESIRABLE TO FOLLOW AN APPROVED FERTILIZER AND LIME APPLICATION PROGRAM.
2. PRESENT THE STUDENTS WITH A LIST OF THE ELEMENTS NEEDED BY PLANTS. HAVE THE STUDENTS INDICATE WHICH ELEMENTS ARE PRIMARY ELEMENTS AND WHICH ELEMENTS ARE SECONDARY ELEMENTS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
3. PRESENT THE STUDENTS A CASE PROBLEM WHICH INDICATES A DEFICIENCY IN NITROGEN. HAVE THE STUDENTS INDICATE APPROPRIATE SOURCES OF NITROGEN WHICH MAY BE USED IN THE LOCAL AREA AND ACCORDING TO CONDITIONS STATED IN THE CASE PROBLEM.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. POSTER BOARD TO DEVELOP CHARTS
2. SAMPLES OF PLANTS OR SLIDES SHOWING NUTRIENT DEFICIENCY SYMPTOMS
3. SAMPLES OF VARIOUS SOURCES OF THE NUTRIENTS
4. SAMPLE BUDGETS FOR VARIOUS CROPS AND FOR DIFFERENT LEVELS OF FERTILIZATION

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

SECTIONS INCLUDED IN THESE PUBLICATIONS GENERALLY INCLUDE THE ESSENTIAL ELEMENTS FOR PLANT GROWTH, THE PRIMARY NUTRIENTS, THE SECONDARY NUTRIENTS, THE MICRO-NUTRIENTS, AND LIMING MATERIALS.

2. BE YOUR OWN CORN DOCTOR. WASHINGTON, D.C.: NATIONAL PLANT FOOD INSTITUTE. 4 PAGES.

HELPFUL AS A STUDENT REFERENCE, THIS PAMPHLET PRESENTS COLORED ILLUSTRATIONS OF NUTRIENT DEFICIENCY SYMPTOMS FOUND IN THE LEAVES, ROOTS, AND EARS OF CORN.

3. THE FERTILIZER HANDBOOK. WASHINGTON, D.C.: THE FERTILIZER INSTITUTE.

INCLUDED IN THIS PUBLICATION ARE SECTIONS WHICH DEAL WITH THE BASICS OF PLANT GROWTH, THE VARIOUS NUTRIENTS THAT ARE NEEDED FOR PLANT GROWTH, AND VARIOUS SOURCES OF MATERIALS AVAILABLE TO SUPPLY THE NUTRIENTS.

4. PLANNING A FERTILIZER PROGRAM. VAS 4010A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.

THIS REFERENCE COVERS THE IMPORTANCE OF FOLLOWING A GOOD FERTILIZATION PROGRAM AND PRESENTS INFORMATION REGARDING THE RESPONSES FROM USING LIMESTONE, PHOSPHORUS, AND POTASSIUM.

5. PLANNING THE NITROGEN PROGRAM. VAS 4009A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 16 PAGES.

INCLUDED ARE SECTIONS WHICH COVER THE COMMON CARRIERS OF NITROGEN AND THE RELATIVE COSTS OF THE VARIOUS SOURCES.

6. RECOMMENDING POTASSIUM FERTILIZERS. VAS 4008A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.

INCLUDED IN THIS PUBLICATION IS A SECTION ON THE VARIOUS SOURCES OF POTASH FERTILIZERS.

7. SOIL LIMING - A KEY TO BETTER FARMING. VAS 4006A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.

INCLUDED IN THIS REFERENCE ARE SECTIONS ON THE DIFFERENT KINDS OF LIMING MATERIALS, DETERMINING WHICH LIMING MATERIALS TO APPLY, AND FACTORS TO CONSIDER IN SELECTING LIMING MATERIALS.

8. USING PHOSPHORUS FERTILIZERS. VAS 4007. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 4 PAGES.

INCLUDED IN THIS PUBLICATION IS A COMPARISON OF ROCK PHOSPHATE AND SOLUABLE PHOSPHATE.

DETERMINING FERTILIZER AND LIME NEEDS

UNIT CONCEPT: SOIL FERTILITY LEVELS ARE A MAJOR FACTOR IN DETERMINING PROFITS OR LOSSES IN CROP PRODUCTION. THE EMPLOYEE IN THE AGRICULTURE SUPPLY AND SERVICE FIRM OR IN THE CUSTOM FERTILIZER OR LIME FIRM MAY BE CALLED UPON TO TAKE SOIL SAMPLES FOR CUSTOMERS AND TO ASSIST IN INTERPRETING THE SOIL TEST RESULTS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN GIVEN A SPECIFIC AREA TO BE SAMPLED FOR PH AND SOIL FERTILITY LEVELS, CORRECTLY TAKE CORES OF SOIL TO BE USED IN FORMING A REPRESENTATIVE SAMPLE, PREPARE THE SAMPLE FOR PROCESSING, AND COMPLETE THE FORMS NEEDED BY THE SOIL TESTING LABORATORY TO COMPLETE THE ANALYSIS OF THE SOIL.
2. WHEN PRESENTED WITH FERTILIZER TAGS OR FERTILIZER BAGS, CORRECTLY INTERPRET THE INFORMATION ON THE FERTILIZER TAG OR BAG.
3. USING COMPLETED AND PROCESSED SOIL TESTING LABORATORY REPORT FORMS, CALCULATE THE CORRECT AMOUNTS OF GIVEN LIME AND FERTILIZER MATERIALS NEEDED FOR A GIVEN AREA.

B. INSTRUCTIONAL AREAS

1. TAKING SOIL SAMPLES TO DETERMINE THE NUTRIENTS REQUIRED IN A GIVEN AREA
 - A. DETERMINING WHAT INFORMATION WILL BE PROVIDED BY SOIL TEST RESULTS
 - B. SELECTING THE EQUIPMENT NECESSARY FOR TAKING SOIL SAMPLES
 - C. FOLLOWING APPROVED SOIL SAMPLING TECHNIQUES TO OBTAIN REPRESENTATIVE CORES TO BE USED IN MAKING THE COMPOSITE SAMPLE
 - D. FOLLOWING PROCEDURES TO PREPARE THE SOIL SAMPLE FOR PROCESSING
 - E. FILLING OUT THE APPROPRIATE FORMS AND SUBMITTING THE SOIL SAMPLE FOR TESTING

2. INTERPRETING THE SOIL TEST REPORT TO DETERMINE THE NUTRIENT LEVEL AND THE REQUIREMENTS
 - A. DETERMINING THE SOIL PH FROM A SOIL TEST RESULT FORM AND THE NEED FOR LIME
 - B. DETERMINING THE SOIL LEVELS OF AVAILABLE NUTRIENTS FROM THE SOIL TEST RESULTS AND THE NEED FOR NUTRIENTS
 - C. EXPLAINING THE SOIL TEST RESULTS TO THE CUSTOMERS
3. CONSIDERING THE VARIOUS FACTORS IMPORTANT IN ASSISTING TO MAKE LIME AND FERTILIZER RECOMMENDATIONS TO A CUSTOMER
 - A. DETERMINING THE PAST CROP ROTATIONS AND THE YIELDS OBTAINED
 - B. DETERMINING THE REQUIREMENTS OF THE CROPS TO BE GROWN
 - C. CONSIDERING THE AVAILABILITY OF NUTRIENTS IN THE SOIL
 - D. CALCULATING THE TOTAL LIME AND FERTILIZER REQUIREMENTS
4. CONSIDERING THE VARIOUS MATERIALS AVAILABLE TO SUPPLY THE NUTRIENT REQUIREMENTS
 - A. CONSIDERING THE VARIOUS SOURCES OF MATERIALS SUCH AS COMPLETE FERTILIZERS
 - B. CONSIDERING THE VARIOUS RATIOS AND GRADES OF MATERIALS AVAILABLE
5. ASSISTING IN RECOMMENDING THE KINDS AND AMOUNTS OF FERTILIZER AND LIME TO APPLY FOR SPECIFIC CROPS
 - A. CALCULATING THE AMOUNT OF PLANT FOOD AVAILABLE IN A FERTILIZER OR LIME MATERIAL
 - B. CALCULATING THE TOTAL AMOUNT OF FERTILIZER AND LIME NEEDED PER ACRE FOR A SPECIFIC CROP
6. COMPUTING THE COST OF THE LIME AND FERTILIZER FOR A SPECIFIC SITUATION
 - A. DETERMINING THE COST PER UNIT FOR A GIVEN KIND OF FERTILIZER AND/OR LIME MATERIAL
 - B. CALCULATING THE TOTAL COST OF THE LIME AND/OR FERTILIZER REQUIRED FOR A SPECIFIC SITUATION

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS USE APPROPRIATE TOOLS SUCH AS SHOVELS, AUGERS OR PROBES AND BUCKETS TO TAKE SOIL CORES, FORM A COMPOSITE SAMPLE FOR AN AREA, AND FILL OUT THE APPROPRIATE SOIL TEST FORMS REQUIRED BY A TESTING LABORATORY.
2. HAVE THE STUDENTS USE THE ANALYSIS STATED ON VARIOUS FERTILIZER BAGS TO CALCULATE THE NUMBER OF POUNDS OF FERTILIZER MATERIAL REQUIRED TO SUPPLY A GIVEN AMOUNT OF ACTUAL NUTRIENTS, SUCH AS - HOW MUCH 20% SUPERPHOSPHATE IS REQUIRED TO SUPPLY 200 POUNDS OF P_2O_5 ?
3. HAVE THE STUDENTS USE THE SOIL TEST RESULTS FOR A SPECIFIC SITUATION, CALCULATE THE AMOUNT OF ACTUAL NUTRIENTS NEEDED PER ACRE, CALCULATE THE RELATIVE AMOUNTS OF VARIOUS FERTILIZER OR LIME MATERIALS NEEDED, AND THE RELATIVE COSTS OF THE VARIOUS MATERIALS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH A CASE PROBLEM WHICH CONTAINS APPROPRIATE INFORMATION NEEDED TO COMPLETE A SOIL TEST PROCESSING FORM. HAVE THE STUDENTS ACCURATELY COMPLETE THE FORM TO BE SENT TO THE SOIL TESTING LABORATORY.
2. PRESENT THE STUDENTS WITH AN ILLUSTRATION OF A FERTILIZER BAG. HAVE THE STUDENTS DETERMINE WITH COMPLETE ACCURACY THE RATIO OF THE CONTENTS, AND THE POUNDS OF N, P, K IN THE BAG.
3. PRESENT THE STUDENTS WITH INFORMATION ON THE SOIL TEST RESULTS FORM AND ADDITIONAL INFORMATION, SUCH AS, THE CROP TO BE PLANTED AND THE EXPECTED YIELD. HAVE THE STUDENT CALCULATE THE CORRECT AMOUNT OF FERTILIZER OF A GIVEN ANALYSIS NEEDED.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SPADE, PROBE, AUGER, PLASTIC PAILS AND FORMS TO BE USED IN TAKING A SOIL SAMPLE AND GETTING THE SAMPLE READY TO BE SENT TO THE SOIL TESTING LABORATORY
2. EXAMPLES OF COMPLETED SOIL TEST RESULT FORMS TO BE USED IN CALCULATING THE AMOUNT OF NUTRIENTS NEEDED
3. FERTILIZER BAGS OF VARIOUS ANALYSES TO BE USED BY STUDENTS TO DETERMINE THE RELATIVE AMOUNTS OF ACTUAL NUTRIENTS PRESENT IN VARIOUS GRADES OF FERTILIZER

4. CHART SHOWING THE PRICES OF VARIOUS FERTILIZERS AND LIME TO BE USED IN COMPUTING TOTAL COSTS

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

INCLUDED ARE SECTIONS REGARDING THE COLLECTION OF A SOIL SAMPLE, PROCESSING OF THE SAMPLE, INTERPRETATION OF THE RESULTS, AND INTERPRETATION OF FERTILIZER GRADES AND RATIOS.

2. COURSE OF STUDY IN AGRICULTURAL OCCUPATIONS. LEXINGTON, KENTUCKY: DEPARTMENT OF AGRICULTURAL EDUCATION, UNIVERSITY OF KENTUCKY. 1967, PP. 169-173.

A TEACHER'S REFERENCE, THIS PUBLICATION WILL BE HELPFUL TO THE TEACHER IN PLANNING SPECIFIC LESSONS OVER THE PREVIOUS TOPIC AREAS. INCLUDED ARE VARIOUS EXAMPLES AND TEACHING PROCEDURES THAT WILL ASSIST THE TEACHER IN PRESENTING THE TECHNICAL INFORMATION NECESSARY TO COVER THE STUDY AREAS.

3. THE FERTILIZER HANDBOOK. WASHINGTON, D.C.: THE FERTILIZER INSTITUTE. 1974, PP. 117-128.

THIS REFERENCE COVERS THE BASICS OF SOIL TESTING IN A MANNER THAT THE STUDENT CAN UNDERSTAND.

4. HOW TO TAKE A GOOD SOIL SAMPLE. LEAFLET 168. COLUMBUS, OHIO: COOPERATIVE EXTENSION SERVICE, THE OHIO STATE UNIVERSITY. 4 PAGES.

SECTIONS COVERED IN THIS STUDENT REFERENCE INCLUDE USING SOIL SAMPLING TOOLS, SOIL SAMPLING TECHNIQUES, GETTING A COMPOSITE SAMPLE, PROCESSING THE SOIL SAMPLE, AND SUBMITTING THE SOIL SAMPLE.

5. PLANNING THE NITROGEN PROGRAM. VAS 4009A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 16 PAGES.

THIS REFERENCE COVERS SUCH AREAS AS THE VARIOUS TYPES OF NITROGEN CARRIERS, HOW MUCH NITROGEN TO APPLY, WHEN THE NITROGEN FERTILIZERS SHOULD BE APPLIED AND HOW THEY SHOULD BE APPLIED.

6. SOIL LIMING - A KEY TO BETTER FARMING. VAS 4006A. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.

THIS PUBLICATION COVERS THE AREAS REGARDING THE KINDS OF LIMING MATERIALS, FACTORS TO CONSIDER IN SELECTING LIMING MATERIALS, DETERMINING WHICH LIMING MATERIALS TO USE, HOW MUCH LIME TO APPLY, AND APPLICATION OF LIME.

APPLYING FERTILIZER AND LIME MATERIALS

UNIT CONCEPT: IT IS IMPORTANT FOR THE EMPLOYEE IN THE FERTILIZER AND LIME DEALERSHIP TO BE ABLE TO FOLLOW APPROPRIATE PRACTICES IN APPLYING LIME AND FERTILIZER MATERIALS. IN ADDITION, HE MAY BE ASKED TO ADVISE CUSTOMERS REGARDING THE APPROPRIATE TIME TO APPLY LIME AND FERTILIZER AND THE PLACEMENT OF SUCH MATERIALS. BY PROPERLY APPLYING OR ADVISING CUSTOMERS APPLYING LIME AND FERTILIZER MATERIALS THE EMPLOYEE CAN ASSIST IN AVOIDING THE BURNING OF SEEDS AND PLANTS AND THE LOSS OF NUTRIENTS THROUGH LEACHING AND FIXATION.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PROVIDED APPROPRIATE INFORMATION REGARDING FERTILIZER AND/OR LIME MATERIALS TO BE APPLIED, ASSIST IN DETERMINING WHEN TO APPLY THE MATERIALS AND HOW TO APPLY THE MATERIALS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
2. WHEN EMPLOYED IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM THAT OPERATES A CUSTOM APPLICATION SERVICE, OPERATE AND MAINTAIN THE APPLICATION EQUIPMENT AS DESCRIBED IN THE OPERATOR'S MANUAL OR AS DIRECTED BY THE EMPLOYER.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHEN TO APPLY LIME AND FERTILIZER MATERIALS
 - A. FACTORS TO CONSIDER IN DETERMINING WHEN TO APPLY LIMING MATERIALS
 - (1) PREVIOUS LIMING HISTORY OF THE LAND
 - (2) CROPPING PATTERN OR ROTATION
 - B. FACTORS TO CONSIDER IN DETERMINING WHEN TO APPLY FERTILIZER MATERIALS
 - (1) SOIL FACTORS
 - (2) FORM IN WHICH THE FERTILIZER MATERIAL IS TO BE APPLIED
 - (3) CLIMATIC CONDITIONS
 - (4) CROPPING ROTATION BEING FOLLOWED

2. DETERMINING WHAT METHOD SHOULD BE FOLLOWED FOR APPLYING THE FERTILIZER MATERIALS

A. IDENTIFYING THE VARIOUS FORMS IN WHICH FERTILIZERS MAY BE APPLIED

- (1) LIQUID FORMS
- (2) DRY OR SOLID FORMS
- (3) GASEOUS FORMS

B. FACTORS TO BE CONSIDERED IN DETERMINING THE FORM IN WHICH THE FERTILIZER MATERIALS SHOULD BE APPLIED

- (1) THE CROPPING ROTATION
- (2) SOIL CONDITIONS
- (3) CLIMATIC CONDITIONS
- (4) TIME OF APPLICATION
- (5) RATE OF APPLICATION
- (6) TYPE AND FORM OF FERTILIZER BEING APPLIED
- (7) EQUIPMENT AVAILABLE TO APPLY THE FERTILIZER

C. DETERMINING THE METHODS TO USE FOR APPLYING DRY AND LIQUID FERTILIZER MATERIALS

- (1) BROADCAST APPLICATIONS
- (2) APPLICATIONS AT PLANTING TIME
- (3) SIDE DRESSING APPLICATIONS
- (4) TOP DRESSING APPLICATIONS
- (5) ANHYDROUS AMMONIA AND SOLUTION APPLICATIONS
- (6) STARTER SOLUTION APPLICATIONS
- (7) FOLIAR APPLICATIONS
- (8) APPLICATION WITH IRRIGATION WATER

3. OPERATING, ADJUSTING, AND MAINTAINING VARIOUS ITEMS OF EQUIPMENT IN AGRICULTURAL SUPPLY AND SERVICE FIRMS USED FOR APPLYING FERTILIZERS AND LIME

A. OPERATING OR ASSISTING TO OPERATE SUCH EQUIPMENT AS BROADCAST FERTILIZER SPREADERS AND LIME SPREADING EQUIPMENT

B. CALIBRATING OR ADJUSTING THE APPLICATION EQUIPMENT

C. MAINTAINING AND SERVICING THE APPLICATION EQUIPMENT

- (1) GREASING AND OILING THE EQUIPMENT
- (2) ADJUSTING BELTS, BEARINGS, AND DRIVE CHAINS
- (3) CLEANING AND STORING THE APPLICATION EQUIPMENT

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS VISIT WITH A LOCAL DEALER WHO OWNS A CUSTOM FERTILIZER AND LIME APPLICATION SERVICE. HAVE THE STUDENTS DISCUSS WITH HIM HOW HE ASSISTS CUSTOMERS IN DETERMINING WHEN TO APPLY LIMING MATERIALS FOR VARIOUS SITUATIONS.
2. HAVE THE STUDENTS CLEAN AND PREPARE A TRUCK LIME SPREADER BOX FOR WINTER STORAGE.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH A CASE PROBLEM WHICH DESCRIBES THE AMOUNT OF LIME TO BE APPLIED PER ACRE, THE CROPPING ROTATION, AND THE USE OF THE INTENDED CROP. HAVE THE STUDENTS DETERMINE WHEN LIME MAY BE APPLIED AT A LEVEL OF PERFORMANCE ACCEPTABLE TO LOCAL STANDARDS.
2. HAVE THE STUDENTS ADJUST THE DRIVE CHAIN ON A TRUCK LIME SPREADER BOX ACCORDING TO DIRECTIONS AND SPECIFICATIONS IN THE OPERATOR'S MANUALS.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. GREASE AND GREASE GUN
2. OIL AND SPRING ACTION OILERS
3. APPROPRIATE SMALL HAND TOOLS SUCH AS WRENCHES, PLIERS, HAMMERS, SCREWDRIVERS, WRECKING BAR, AND SOCKET SET
4. VARIOUS FORMS OF FERTILIZER MATERIALS

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

GENERALLY THESE PUBLICATIONS PROVIDE INFORMATION REGARDING THE METHODS OF APPLYING FERTILIZERS AND THE TIME OF FERTILIZER AND LIME APPLICATIONS.

2. FARM CHEMICALS HANDBOOK. WILLOUGHBY, OHIO: MEISTER PUBLISHING COMPANY. 1974, 470 PAGES.

INCLUDED IN THIS PUBLICATION IS A SECTION WHICH GIVES SPECIFICATIONS ON FERTILIZER AND LIME APPLICATION EQUIPMENT SUCH AS TOW TYPE AND TRUCK TYPE DRY AND LIQUID FERTILIZER APPLICATORS.

3. THE FERTILIZER HANDBOOK. WASHINGTON, D.C.: NATIONAL PLANT FOOD INSTITUTE. 1974, 264 PAGES.

BRIEFLY COVERED IN THIS PUBLICATION ARE SECTIONS WHICH DEAL WITH THE FACTORS TO BE CONSIDERED IN DETERMINING THE TIME OF APPLICATION AND THE METHODS OF APPLICATION.

4. MC VICKER, MALCOLM H. USING COMMERCIAL FERTILIZERS. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1969, PP. 181-221.

A STUDENT REFERENCE, THIS PUBLICATION COVERS SUCH TOPIC AREAS AS FACTORS TO CONSIDER IN FERTILIZER PLACEMENT, APPLICATION OF LIQUID FERTILIZERS, FALL APPLICATION OF FERTILIZERS, AND FERTILIZER DISTRIBUTING MACHINERY.

5. OPERATOR'S MANUALS FOR THE VARIOUS ITEMS OF APPLICATION EQUIPMENT.

THESE MANUALS WILL PROVIDE OPERATING INSTRUCTIONS AND GENERAL MAINTENANCE AND REPAIR PROCEDURES.

HANDLING AND STORING FERTILIZERS

UNIT CONCEPT: THE LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRM OR CUSTOM APPLICATION SERVICE GENERALLY HAS STORAGE FACILITIES WHERE FERTILIZER MATERIALS ARE STORED FOR SALE. THE EMPLOYEE WHO CAN ASSIST IN PROPERLY STORING FERTILIZER IN A SAFE MANNER WILL ASSIST IN REDUCING LOSSES TO FERTILIZER MATERIALS CAUSED BY FIRES OR EXPLOSIONS, RODENTS, MOISTURE, AND OTHER FACTORS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN WORKING IN THE FIRM WHICH STORES FERTILIZER MATERIALS, PREPARE STORAGE AREAS FOR FERTILIZERS BY CLEANING THE STORAGE AREA ACCORDING TO THE DIRECTIONS OF THE EMPLOYER.
2. WHEN WORKING IN A FIRM THAT STORES FERTILIZER MATERIALS, OPERATE FORK LIFTS AND OTHER TRANSPORTING EQUIPMENT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS.

B. INSTRUCTIONAL AREAS

1. PREPARING THE STORAGE AREAS

- A. CLEANING THE DEBRIS FROM THE STORAGE AREA
- B. INSPECTING THE STORAGE AREA FOR LOOSE OR SPLINTERED BOARDS AND PROTRUDING NAILS OR BOLTS WHICH COULD TEAR FERTILIZER BAGS
- C. INSPECTING FOR WATER LEAKAGE WHICH COULD DAMAGE FERTILIZER
- D. USING APPROVED RODENT CONTROL PROCEDURES

2. STORING FERTILIZER

A. FACTORS TO BE CONSIDERED IN STORING FERTILIZER

- (1) TURN OVER RATE OF VARIOUS FERTILIZER MATERIALS
- (2) AMOUNT OF MATERIAL TO BE USED
- (3) SEASONAL DEMANDS FOR THE MATERIAL
- (4) PHYSICAL CONDITIONS IN THE STORAGE AREA

- (5) SAFETY PRECAUTIONS THAT NEED TO BE FOLLOWED FOR STORING VARIOUS FERTILIZER MATERIALS
 - (6) OTHER FACTORS UNIQUE TO THE LOCAL BUSINESS
- B. STORING THE FERTILIZER MATERIALS
- C. DETERMINING HOW MUCH OF A SPECIFIC FERTILIZER IS IN STORAGE
 - (1) CHECKING THE INVENTORY RECORDS
 - (2) ESTIMATING THE AMOUNT OF MATERIALS BY VOLUME
- D. OPERATING THE VARIOUS ITEMS OF EQUIPMENT USED IN THE FERTILIZER STORAGE AREA SUCH AS FORK LIFTS AND BELT CONVEYORS
 - (1) FOLLOWING PROPER AND SAFE OPERATING PROCEDURES WHEN USING SUCH EQUIPMENT
 - (2) MAINTAINING AND SERVICING SUCH EQUIPMENT
 - (A) LUBRICATING THE EQUIPMENT
 - (B) PERFORMING MINOR MAINTENANCE AND ADJUSTMENT REQUIREMENTS
- 3. TRANSPORTING FERTILIZER MATERIALS
 - A. INSPECTING THE TRUCK OR CAR FOR PROTRUDING NAILS, BOLTS, OR SPLINTERED BOARDS THAT COULD CAUSE BAGS TO TEAR
 - B. INSPECTING FOR LEAKY ROOFS, LOOSE FITTING DOORS AND WORN TARPS WHICH COULD RESULT IN WATER DAMAGE
 - C. REMOVING EXCESS DEBRIS FROM THE CAR OR TRUCK
 - D. LOADING AND UNLOADING THE CAR OR TRUCK
- 4. SAFETY PRECAUTIONS AND REGULATIONS REGARDING THE STORAGE AND HANDLING OF FERTILIZERS
 - A. STATE AND FEDERAL REGULATIONS REGARDING THE STORAGE AND HANDLING OF MATERIALS
 - B. GENERAL FIRST AID PROCEDURES FOR PERSONS RECEIVING EYE OR OTHER INJURY FROM FERTILIZER MATERIALS
 - C. GENERAL SAFETY PRECAUTIONS FOR STORING AND HANDLING VARIOUS FERTILIZERS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS CLEAN THE FERTILIZER STORAGE AREA BY SWEEPING ALL DEBRIS FROM THE AREA AND CONTROL RODENTS BY USING CHEMICALS AS DIRECTED ON THE CHEMICAL LABELS.
2. HAVE THE STUDENTS LOAD BAGGED FERTILIZER ON A SEMI-TRAILER TRUCK BY OPERATING A FORK LIFT.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. WHILE WORKING IN AN AGRICULTURAL SUPPLY AND SERVICE FIRM, HAVE THE STUDENTS USE CHEMICALS AS DIRECTED ON THE LABEL IN THE FERTILIZER STORAGE AREA TO CONTROL RODENTS.
2. HAVE THE STUDENTS OPERATE A FORK LIFT TO PICK UP, TRANSPORT, AND UNLOAD PALLETS OF BAGGED FERTILIZER. EVALUATE THE STUDENTS BY CONSIDERING WHETHER SAFE OPERATING PROCEDURES WERE FOLLOWED AS DETAILED IN THE OPERATOR'S MANUAL AND WHETHER BAGS OF FERTILIZER WERE SPILLED FROM THE PALLET OR TORN OPEN.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. ACCESS TO COOPERATIVE WORK STATIONS
2. ACCESS TO TRUCKS OR RAIL CARS
3. FORK LIFT
4. PALLETS
5. BAGGED FERTILIZER
6. GREASE, GREASE GUN, OIL, SPRING OILERS, AND SMALL HAND TOOLS

F. EXAMPLES OF SUPPORTING REFERENCES

1. OPERATOR'S MANUALS FOR THE VARIOUS EQUIPMENT USED IN HANDLING AND STORING FERTILIZERS

THESE REFERENCES GENERALLY WILL INCLUDE OPERATING PROCEDURES FOR THE VARIOUS ITEMS OF EQUIPMENT AND MAINTENANCE AND SERVICE PROCEDURES TO FOLLOW.

IV

SEEDS

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QUALITY CONTROL REGULATIONS IN THE SEED INDUSTRY

MAKING SEED RECOMMENDATIONS

SEED PROCESSING

STORAGE AND HANDLING OF SEEDS

QUALITY SEED PRODUCTION

QUALITY CONTROL REGULATIONS IN THE SEED INDUSTRY

UNIT CONCEPT: THE PRIMARY PURPOSE OF THE LAWS AND REGULATIONS IN THE UNITED STATES IS TO INSURE THAT SEED IS LABELED TRUTHFULLY. THE EMPLOYEE IN THE SEED FIRM WILL NEED TO BE ABLE TO INTERPRET SEED LABELS FOR LOCAL CUSTOMERS WHO DESIRE TO KNOW SPECIFIC INFORMATION ABOUT VARIOUS SEEDS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN APPROACHED BY CUSTOMERS, ACCURATELY INTERPRET SEED TAGS AND LABELS ATTACHED TO VARIOUS SEEDS AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.
2. WHEN PRESENTED VARIOUS SEEDS TO BE LABELED, ACCURATELY PREPARE LABELS FOR SUCH SEEDS TO MEET GOVERNMENT REGULATIONS.
3. WHEN PRESENTED A QUANTITY OF SEED TO BE ANALYZED, DRAW A REPRESENTATIVE SAMPLE OF SEED FOR ANALYSIS.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHAT INFORMATION MAY BE CONTAINED ON SEED TAGS AND LABELS
 - A. FEDERAL LAW AND REGULATION REQUIREMENTS
 - B. STATE LAW AND REGULATION REQUIREMENTS
 - C. CULTURAL INFORMATION PROVIDED BY THE GROWER TO INDUCE THE PURCHASER TO BUY
 - D. WARRANTY OR DISCLAIMER OF LIABILITY INFORMATION PROVIDED BY THE GROWER
2. IDENTIFYING VARIOUS STATE LAWS AND REGULATIONS FOR SEEDS
 - A. THE STATE SEED LAW AND ITS PURPOSE
 - (1) LABEL REQUIREMENTS
 - (2) GERMINATION TEST EXCEPTIONS
 - (3) TREATMENT OF SEEDS

- (4) LABEL ATTACHMENTS BY THE SELLER OF SEED
- (5) SELLING OF CERTIFIED SEED, REGISTERED SEED, OR FOUNDATION SEED
- (6) SELLING OF SCREENINGS
- (7) ADVERTISING RESTRICTIONS AND REQUIREMENTS
- (8) HINDERANCE OF PERSONS ENFORCING THE LAW

B. ADMINISTERING THE STATE SEED LAW

- (1) THE SEED INSPECTION SECTION OF THE DIVISION OF PLANT INDUSTRY AND ITS ROLE
- (2) PERSONNEL INVOLVED IN THE ENFORCEMENT, INSPECTION, AND ANALYSIS OF SEEDS

3. INTERPRETING THE INFORMATION CONTAINED ON THE SEED TAGS OR LABELS

- A. KIND OF SEED
- B. VARIETY OF SEED
- C. LOT NUMBER
- D. ORIGIN
- E. PERCENTAGE OF WEED SEEDS PRESENT
- F. NOXIOUS WEED SEEDS
 - (1) PRIMARY NOXIOUS WEED SEEDS
 - (2) SECONDARY NOXIOUS WEED SEEDS
- G. PERCENTAGE OF INERT MATERIAL PRESENT
- H. PERCENTAGE OF GERMINATION
- I. GERMINATION TESTING DATE
- J. PERCENTAGE OF OTHER CROP SEEDS
- K. PERCENTAGE OF HARD SEEDS PRESENT
- L. PURITY PERCENTAGE
- M. NAME AND ADDRESS OF SHIPPER, SELLER, OR PERSON WHO LABELED THE SEED
- N. OTHER SPECIFIC REQUIREMENTS WHICH PERTAIN TO YOUR STATE

4. TAGGING OR LABELING SEED FOR SALE

- A. TYPES OF LABELS AND TAGS OR COLOR OF LABEL OR TAGS TO BE USED
- B. SPECIAL LABELING PROCEDURES TO FOLLOW AS DEFINED BY LAW SUCH AS LABELING TREATED SEEDS

5. TAKING SEED SAMPLES TO BE USED FOR TESTING AND ANALYSIS

- A. PERSONNEL AUTHORIZED TO TAKE SEED SAMPLES
- B. EQUIPMENT USED TO TAKE SAMPLES
- C. DRAWING REPRESENTATIVE SEED SAMPLES FROM VARIOUS TYPES OF SEEDS BY FOLLOWING OFFICIAL SAMPLING RULES
- D. COMPLETING APPROPRIATE FORMS FOR THE SEED SAMPLES AND INCLUDING THE SEED LABEL
- E. VARIOUS TESTS AND ANALYSIS PROCEDURES UTILIZED BY THE SEED INSPECTION SECTION
 - (1) PURITY AND ORIGIN ANALYSIS
 - (2) GERMINATION TESTS
 - (3) MOISTURE DETERMINATIONS
 - (4) SEED BOURNE ORGANISMS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. HAVE THE STUDENTS COLLECT SEED TAGS OR LABELS FOR VARIOUS SEEDS AND USE APPROPRIATE TECHNICAL REFERENCES TO INTERPRET THE INFORMATION CONTAINED ON THE TAGS AND LABELS.
- 2. HAVE THE STUDENTS PREPARE LABELS OR TAGS FOR SEEDS THAT HAVE BEEN TREATED WITH POSIONOUS MATERIALS.
- 3. HAVE THE STUDENTS USE APPROPRIATE EQUIPMENT TO DRAW A REPRESENTATIVE SAMPLE FROM BULK SEED AS IT IS BEING TRANSFERRED TO THE BIN AFTER CLEANING.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

- 1. DEVELOP AN OBJECTIVE EXERCISE FOR THE STUDENTS TO COMPLETE USING INFORMATION OBTAINED FROM A SEED LABEL OR SEED TAG. HAVE THE STUDENTS COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE TEACHER.

2. PRESENT STUDENTS WITH APPROPRIATE TECHNICAL INFORMATION REGARDING SEEDS IN A CASE STUDY-TYPE OF PROBLEM. USING SEED TAGS OR LABELS AND APPROPRIATE EQUIPMENT, HAVE THE STUDENTS CORRECTLY PREPARE LABELS FOR THE SEED ACCORDING TO GOVERNMENT REGULATIONS.
3. HAVE THE STUDENTS USE A TRIER TO DRAW A REPRESENTATIVE SAMPLE FROM A BAG OF SEED. EVALUATE THE STUDENTS BY CONSIDERING WHETHER THE TRIER WAS INSERTED INTO THE BAG IN A HORIZONTAL POSITION WITH THE SLOT DOWN AND WHETHER THE TRIER WAS REMOVED WITH THE SLOT UP.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. COPIES OF THE STATE SEED LAW FOR STUDENTS TO USE
2. SEED TAGS AND LABELS
3. FORMS USED WHEN SAMPLING SEED FOR ANALYSIS PURPOSES
4. SINGLE TUBE TRIER OF VARIOUS SIZES FROM 3/8" TO 1"
5. STANDARD GRAIN PROBE WITH PARTITIONS
6. SAMPLING PANS
7. TYPEWRITER
8. QUANTITIES OF SEEDS IN BAGS AND IN BINS FOR THE STUDENTS TO SAMPLE

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL SUPPLIES - STUDENT STUDY GUIDE. MONTGOMERY, ALABAMA: STATE DEPARTMENT OF EDUCATION, AGRICULTURAL EDUCATION SERVICE. 154 PAGES.

INCLUDED IN THIS STUDENT STUDY MANUAL ARE ACTIVITIES AND QUESTIONS FOR THE STUDENTS TO COMPLETE REGARDING SEED LABELING INFORMATION, TAKING SEED SAMPLES, INTERPRETING SEED TAGS, AND VARIOUS ANALYSIS PROCEDURES.

2. IF IT'S IN THE BAG - IT'S LISTED ON THE TAG! COLUMBUS, OHIO: OHIO SEED IMPROVEMENT ASSOCIATION. 4 PAGES.

BRIEFLY OUTLINED IN THIS PAMPHLET IS A DESCRIPTION OF THE VARIOUS ITEMS OF INFORMATION CONTAINED ON THE LABEL OR TAG. STUDENTS WILL FIND THIS A VALUABLE REFERENCE FOR THEIR OWN USE.

3. THE MEANING HAS CHANGED: CERTIFIED SEED. COLUMBUS, OHIO: COOPERATIVE EXTENSION SERVICE. 3 PAGES.

THIS PUBLICATION WHICH WILL BE OF VALUE TO STUDENTS, CONTAINS SPECIFIC INFORMATION RELATED TO THE LABELING OF SEED AND THE FEDERAL SEED ACT OF 1969 AND THE PLANT VARIETY PROTECTION ACT OF 1970.

4. SEEDS: THE YEARBOOK OF AGRICULTURE. WASHINGTON, D.C.: U.S. GOVERNMENT PRINTING OFFICE, THE SUPERINTENDENT OF DOCUMENTS. 1961, 591 PAGES.

INCLUDED IN THIS GENERAL REFERENCE ARE SECTIONS WHICH DEAL WITH LAWS AND REGULATIONS REGARDING THE MARKETING OF SEEDS, TAKING A SEED SAMPLE FOR ANALYSIS, TESTING SEEDS FOR PURITY AND ORIGIN, TESTING FOR GERMINATION, AND TESTING FOR MOISTURE.

5. STATE SEED LAW. AVAILABLE FROM YOUR STATE DEPARTMENT OF AGRICULTURE OR SEED INSPECTION SECTION.

THIS REFERENCE SHOULD BE MADE AVAILABLE TO THE STUDENTS FOR USE IN STUDYING THE AREAS RELATED TO TAG OR LABEL REQUIREMENTS AND THE ENFORCEMENT OF THE LAW.

MAKING SEED RECOMMENDATIONS

UNIT CONCEPT: THE EMPLOYEE IN THE SEED FIRM OR IN AGRICULTURAL SUPPLY AND SERVICE FIRMS SELLING SEEDS WILL NEED TO PROVIDE FARMERS WITH INFORMATION REGARDING CERTAIN VARIETIES OF SEED. THE EMPLOYEE WHO CAN ASSIST THE FARMER WITH VARIETY QUALITY AND QUANTITY INFORMATION WILL DO MUCH TO SATISFY THE CUSTOMER AND BUILD "REPEAT" BUSINESS FOR THE FIRM.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN ASKED SPECIFIC QUESTIONS ABOUT CERTAIN VARIETIES OF SEEDS, LOCATE SOURCES OF SUCH INFORMATION AND PRESENT SUCH INFORMATION TO THE CUSTOMER IN A MANNER ACCEPTABLE TO THE LOCAL EMPLOYER.
2. WHEN ASKED TO PROVIDE MIXTURES FOR SPECIFIC PURPOSES, LOCATE AND USE TECHNICAL REFERENCES WHICH CONTAIN SPECIFIC INFORMATION FOR MIXTURES USED LOCALLY AND PRESENT SUCH INFORMATION THE THE CUSTOMER IN A MANNER ACCEPTABLE TO THE LOCAL EMPLOYER.
3. WHEN ASKED TO PROVIDE A QUANTITY OF SEED FOR A CUSTOMER, ACCURATELY DETERMINE THE AMOUNT OF SEED NEEDED BY THE FARMER TO SEED A GIVEN ACREAGE.

B. INSTRUCTIONAL AREAS

1. RECOMMENDING ADAPTED VARIETIES OF SEEDS
 - A. IDENTIFICATION OF VARIOUS KINDS OF SEEDS COMMONLY SOLD BY LOCAL FIRMS
 - B. FACTORS THAT INFLUENCE THE ADAPTABILITY OF VARIOUS VARIETIES TO LOCAL CONDITIONS
 - (1) SOIL CONDITIONS
 - (2) CLIMATIC CONDITIONS
 - (3) GROWING SEASON LENGTH
 - (4) INSECT AND DISEASE PROBLEMS IN THE LOCAL AREA
 - (5) OTHER CHARACTERISTICS UNIQUE TO SPECIFIC CROPS
 - C. LOCAL MARKET DEMANDS AND PREFERENCES THAT AFFECT VARIETAL RECOMMENDATIONS

- D. PURPOSES OF CROP USE AS IT AFFECTS VARIETAL RECOMMENDATIONS
- E. LOCATING AND USING INFORMATION WHICH CONTAINS INFORMATION REGARDING THE CHARACTERISTICS OF VARIOUS VARIETIES
- F. MAKING VARIETAL RECOMMENDATIONS FOR CROPS SUCH AS:
 - (1) CORN
 - (2) WHEAT
 - (3) OATS
 - (4) SOYBEANS
 - (5) OTHER CROPS SPECIFIC TO THE LOCAL AREAS
- G. MAKING VARIETAL RECOMMENDATIONS FOR MIXTURES SUCH AS:
 - (1) COVER CROP MIXTURES
 - (2) PASTURE MIXTURES
 - (3) LAWN MIXTURES
 - (4) HAY-CROP MIXTURES
 - (5) OTHER MIXTURES COMMONLY USED IN THE LOCAL AREAS
- 3. DETERMINING THE AMOUNT OF SEED NEEDED FOR SPECIFIC SITUATIONS
 - A. DETERMINING THE AMOUNT OF ACREAGE INVOLVED IN PLANTING
 - B. LOCATING APPROPRIATE TECHNICAL INFORMATION AND DETERMINING THE SEEDING RATES FOR VARIOUS CROPS
 - C. CALCULATING THE AMOUNT OF SEED NEEDED FOR A SPECIFIC SITUATION
 - D. VOLUME WEIGHTS OF VARIOUS SEEDS
- 4. PROVIDING INFORMATION TO CUSTOMERS REGARDING CULTURAL PRACTICES
 - A. SEEDING DATES FOR LOCAL AREAS REGARDING:
 - (1) FIELD CROPS
 - (2) VEGETABLE AND GARDEN PLANTS
 - (3) LAWN PLANTS
 - B. SEED BED PREPARATION PRACTICES
 - C. PLANTING OR SEEDING PRACTICES REGARDING SUCH FACTORS AS PLANTING DEPTH, FERTILIZATION PRACTICES

D. CROPPING SYSTEMS AND PRACTICES

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS ROLE PLAY A SITUATION WHERE A CUSTOMER COMES INTO A SEED STORE AND DESIRES INFORMATION REGARDING CERTAIN SEED VARIETIES RECOMMENDED FOR THE LOCAL AREA. HAVE THE STUDENTS USE APPROPRIATE TECHNICAL INFORMATION TO DESCRIBE THE ADVANTAGES AND DISADVANTAGES OF CERTAIN SEED VARIETIES.
2. HAVE THE STUDENTS USE TECHNICAL REFERENCES TO DETERMINE APPROPRIATE MIXTURES FOR PERMANENT OR LONG-LAY PASTURES IN THE LOCAL AREA.
3. HAVE THE STUDENTS USE TECHNICAL REFERENCES TO DETERMINE THE AMOUNT OF SEED A FARMER NEEDS TO PURCHASE FOR GIVEN ACREAGES.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH A CASE STUDY-TYPE PROBLEM WHICH INCLUDES INFORMATION REGARDING THE CROP TO BE PLANTED AND OTHER NECESSARY INFORMATION TO BE CONSIDERED FOR SELECTING VARIETIES. USING TECHNICAL REFERENCES, HAVE THE STUDENTS RECOMMEND A VARIETY OF SEED TO PLANT THAT IS ACCEPTABLE FOR THE LOCAL AREA.
2. PRESENT THE STUDENTS WITH A CASE STUDY-TYPE PROBLEM WHICH INCLUDES INFORMATION REGARDING THE MAIN USE OF THE CROP FOR WHICH A MIXTURE IS BEING PREPARED AND OTHER NECESSARY INFORMATION TO BE CONSIDERED FOR SELECTING VARIETIES. USING TECHNICAL REFERENCES, HAVE THE STUDENTS RECOMMEND A MIXTURE AND THE RATIO OF THE MIXTURE THAT IS ACCEPTABLE FOR THE LOCAL AREA.
3. PRESENT THE STUDENTS WITH INFORMATION REGARDING THE VARIETY OF SEED TO BE PLANTED, THE ACREAGE TO BE PLANTED, AND THE COST PER UNIT FOR SEED. HAVE THE STUDENT CORRECTLY DETERMINE THE AMOUNT OF SEED NEEDED BY THE FARMER AND THE TOTAL COST.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. REFERENCES WHICH CONTAIN CHARTS OF THE VARIOUS VARIETIES OF SEEDS AND WHICH SHOW THE RELATIVE MERITS OF THE VARIETIES

2. SAMPLES OF SEEDS
3. CHARTS SHOWING THE SEEDING RATES
4. CHARTS SHOWING MIXTURES FOR VARIOUS PURPOSES

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

INCLUDED IN THESE PUBLICATIONS WILL BE INFORMATION REGARDING APPROVED VARIETIES FOR YOUR STATE, CULTURAL PRACTICES FOR THE VARIOUS CROPS, YIELDS OBTAINED FROM DIFFERENT VARIETIES, SEEDING RATES, AND PLANTING DATES.

2. BLAND, BRIAN F. CROP PRODUCTION: CEREALS AND LEGUMES. NEW YORK, NEW YORK: ACADEMIC PRESS. 1971, 466 PAGES.

INCLUDED IN THIS REFERENCE ARE CULTURAL PRACTICES WHICH MAY BE FOLLOWED FOR THE VARIOUS CROPS, PLANTING DATES, AND SEEDING RATES.

3. MARTIN, JOHN H. AND LEONARD, WARREN H. PRINCIPLES OF FIELD CROP PRODUCTION. NEW YORK, NEW YORK: THE MAC MILLAN COMPANY. 1967, 1044 PAGES.

INCLUDED IN THIS REFERENCE ARE SECTIONS DEALING WITH CULTURAL PRACTICES FOR THE VARIOUS CROPS, SEEDING RATES PER ACRE, AND WEIGHT PER BUSHEL.

4. SOURCES FOR WHEAT, BARLEY, SOYBEANS, OATS, CORN, ETC. AVAILABLE FROM YOUR STATE SEED IMPROVEMENT ASSOCIATION.

THESE TECHNICAL PAMPHLETS PROVIDE INFORMATION REGARDING THE DESCRIPTION OF DIFFERENT VARIETIES, SOURCES OF VARIOUS VARIETIES, VARIETY CHARACTERISTICS, AND YIELD DATA FOR THE VARIETIES.

SEED PROCESSING

UNIT CONCEPT: SEEDS UNDERGO VARIOUS PROCESSES BEFORE THEY MAY BE SOLD TO LOCAL FARMERS TO PRODUCE CROPS. THE EMPLOYEES IN SEED FIRMS MUST BE ABLE TO OPERATE AND MAINTAIN VARIOUS TYPES OF SEED CLEANING AND TREATING EQUIPMENT IN ORDER TO PROVIDE A QUALITY SEED FOR LOCAL FARMERS AND INCREASE THE SEED FIRM'S PROFITS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN EMPLOYED IN THE SEED PROCESSING FIRM, OPERATE THE VARIOUS TYPE SEED PROCESSING EQUIPMENT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS OR AS DESCRIBED BY THE EMPLOYER.
2. WHEN EMPLOYED IN THE SEED PROCESSING FIRM, MAINTAIN AND SERVICE THE VARIOUS ITEMS OF EQUIPMENT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS OR AS DESCRIBED BY THE EMPLOYER.

B. INSTRUCTIONAL AREAS

1. OBSERVING GENERAL SAFETY PRECAUTIONS FOR WORKING IN THE SEED FIRM
 - A. OBSERVING SAFETY PRECAUTIONS TO PREVENT FIRES IN THE SEED FIRM
 - B. OBSERVING SAFETY PRECAUTIONS IN USING ELECTRICAL EQUIPMENT AND ELECTRICAL OUTLETS
 - C. OBSERVING SAFETY PRECAUTIONS REGARDING PERSONAL DRESS IN WORKING AROUND SEED PROCESSING EQUIPMENT
 - D. OBSERVING SAFETY PRECAUTIONS IN OPERATING VARIOUS ITEMS OF EQUIPMENT USED IN THE SEED FIRM SUCH AS:
 - (1) DRYING EQUIPMENT
 - (2) CONVEYORS AND ELEVATORS
 - (3) SEED SEPARATORS
 - (4) SCALPING EQUIPMENT
 - (5) HULLING EQUIPMENT

- (6) SCARIFYING EQUIPMENT
- (7) DEAWNING AND DEBEARDING EQUIPMENT
- (8) AIR-SCREEN CLEANING EQUIPMENT
- (9) SEPARATING EQUIPMENT
- (10) OTHER SPECILAIZED PROCESSING EQUIPMENT SUCH AS FLASH OR FLAME PROCESSING EQUIPMENT
- (11) BLENDING EQUIPMENT
- (12) TREATING EQUIPMENT SUCH AS INOCULATING EQUIPMENT
- (13) ROLL OR TAPING EQUIPMENT
- (14) BAGGING AND SERVING EQUIPMENT

2. MAINTAINING AND SERVICING THE SEED PROCESSING EQUIPMENT

A. CLEANING THE EQUIPMENT

- (1) REMOVING EXCESSIVE GREASE OR OIL
- (2) REMOVING EXCESSIVE DUST AND DEBRIS FROM THE EQUIPMENT
- (3) REMOVING EXCESSIVE DUST AND DEBRIS FROM THE SURROUNDING AREA

B. SERVICING THE EQUIPMENT USED IN THE SEED PROCESSING FIRM

- (1) LUBRICATING THE EQUIPMENT WITH THE PROPER OIL OR GREASE AND AT APPROPRIATE TIMES
- (2) ADJUSTING BEARINGS AND BELTS
- (3) ADJUSTING SAFETY PROTECTION DEVICES
- (4) REMOVING AND REPLACING BROKEN PARTS

3. OPERATING THE VARIOUS ITEMS OF EQUIPMENT SUCH AS THE BAGGING AND SERVING EQUIPMENT, SEED TREATING EQUIPMENT AND SEPARTING EQUIPMENT

A. OPERATING THE EQUIPMENT SAFELY

B. FOLLOWING THE PROPER SEQUENCE IN OPERATING THE EQUIPMENT

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. HAVE THE STUDENTS OPERATE SEED CLEANING EQUIPMENT SUCH AS AN AIR-SCREEN CLEANER. HAVE THE STUDENTS OPERATE THE EQUIPMENT AND ADJUST THE PITCH OF THE SCREENS, ADJUST THE SHAKE MECHANISM, ADJUST OR REGULATE THE AIR FLOW, AND REGULATE THE FEED MECHANISM BY FOLLOWING PROCEDURES DESCRIBED IN THE SERVICE MANUAL OR OPERATOR'S MANUAL.

2. HAVE THE STUDENTS ADJUST V-BELTS ON THE VARIOUS ITEMS OF EQUIPMENT IN THE SEED PROCESSING PLANT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUALS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. HAVE THE STUDENTS OPERATE VARIOUS EQUIPMENT SUCH AS CLEANING EQUIPMENT AND EVALUATE THE STUDENTS ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS REGARDING SPEED OF OPERATION AND VOLUME OF FEED.
2. HAVE THE STUDENTS ADJUST V-BELTS ON EQUIPMENT ACCORDING TO THE DEGREE OF TENSION SPECIFIED IN THE OPERATOR'S MANUALS OR AS DIRECTED BY THE EMPLOYER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. ACCESS TO COOPERATIVE WORK STATIONS IN SEED FIRMS
2. SAFETY CHECK LISTS
3. "SAFE" AND "UNSAFE" CORDS ON ELECTRIC MOTORS FOR THE STUDENTS TO EXAMINE
4. GREASE GUNS AND GREASE
5. OPERATOR'S MANUALS FOR THE EQUIPMENT
6. OIL AND OILERS
7. SMALL HAND TOOLS SUCH AS PLIERS, WRENCHES, AND SCREWDRIVERS FOR MAKING MINOR REPAIRS AND ADJUSTMENTS

F. EXAMPLES OF SUPPORTING REFERENCES

1. HARMOND, JESSE. SEED CLEANING AND HANDLING. AGRICULTURAL HANDBOOK NO. 179. WASHINGTON, D.C.: AGRICULTURAL RESEARCH SERVICE, U.S. DEPARTMENT OF AGRICULTURE.

INCLUDED IN THIS PUBLICATION ARE DESCRIPTIONS OF VARIOUS EQUIPMENT USED IN THE SEED PROCESSING FIRM SUCH AS THE AIR-SCREEN SEED CLEANER, SPECIFIC GRAVITY SEPARATOR, INDENT DISC SEPARATOR, PNEUMATIC SEPARATORS.

2. OPERATOR'S MANUALS FOR THE VARIOUS ITEMS OF EQUIPMENT.

THESE PUBLICATIONS WILL INCLUDE GENERAL MAINTENANCE AND ADJUSTMENT PROCEDURES FOR THE SPECIFIC ITEMS OF EQUIPMENT THAT THE STUDENT WILL FIND USEFUL WHEN WORKING ON SUCH EQUIPMENT.

3. SEEDS: THE YEARBOOK OF AGRICULTURE. WASHINGTON, D.C.: U.S. GOVERNMENT PRINTING OFFICE, THE SUPERINTENDENT OF DOCUMENTS. 1961, 591 PAGES.

INCLUDED IN THIS GENERAL REFERENCE FOR TEACHERS ARE SECTIONS WHICH FOCUS UPON THE DRYING OF SEEDS, THE CLEANING OF SEEDS, AND SPECIAL PROCESSING AND TREATING OF SEEDS.



STORAGE AND HANDLING OF SEEDS

UNIT CONCEPT: PERSONNEL IN SEED FIRMS NEED TO FOLLOW SPECIFIC PRACTICES IN HANDLING AND STORING SEEDS. THE EMPLOYEES IN THE SEED FIRM WILL NEED TO PREPARE STORAGE BINS, CONTROL INSECTS AND DISEASES, CONTROL RODENTS AND BIRDS, AND PREPARE SEED CONTAINERS IF QUALITY SEEDS ARE TO BE MADE AVAILABLE FOR PURCHASERS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN WORKING IN THE SEED FIRM, CLEAN THE STORAGE AREAS AND BINS AND USE APPROPRIATE DISINFECTANTS ACCORDING TO LABEL DIRECTIONS.
2. WHEN WORKING IN THE SEED FIRM, OPERATE A FORK LIFT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUAL TO TRANSFER TOTE BINS AND BAGGED SEED.

B. INSTRUCTIONAL AREAS

1. DETERMINING THE CONDITIONS FOR STORAGE OF SEEDS

A. FACTORS TO BE CONSIDERED IN THE STORAGE OF SEEDS

B. CONTROLLING MOISTURE CONTENT OF THE SEEDS IN THE STORAGE AREA

- (1) DETERMINING HOW THE MOISTURE CONTENT AFFECTS SEED QUALITY
- (2) METHODS USE TO CONTROL MOISTURE

C. CONTROLLING THE TEMPERATURE WITHIN THE STORAGE AREA

- (1) DETERMINING HOW THE TEMPERATURE IN THE STORAGE AREA MAY AFFECT SEED QUALITY
- (2) METHODS USED TO CONTROL TEMPERATURES IN THE STORAGE AREA

2. HANDLING SEEDS

A. EQUIPMENT USED TO TRANSPORT AND HANDLE SEEDS

- (1) EQUIPMENT IN THE SEED FIRM USED TO HANDLE SEEDS SUCH AS:
 - (A) BUCKET ELEVATORS
 - (B) SELF-CLEANING VERTICAL ELEVATORS
 - (C) PNEUMATIC CONVEYORS
 - (D) BELT CONVEYORS
 - (E) FORK LIFTS AND PALLETS OR TOTE BINS
 - (2) EQUIPMENT USED TO TRANSPORT SEEDS BETWEEN THE PRODUCER, SEED FIRM, AND CUSTOMER SUCH AS:
 - (1) TRUCKS
 - (2) RAIL CAR
- B. UNLOADING SEEDS AS THEY ARRIVE AT THE SEED FIRM FROM THE PRODUCER
- (1) UNLOADING RAIL CARS AT THE SIDING
 - (2) UNLOADING THE CONTENTS OF TRUCKS INTO THE DUMPING PIT
- C. OPERATING EQUIPMENT IN THE SEED FIRM USED TO HANDLE THE BULK SEEDS SUCH AS PNEUMATIC CONVEYORS, BUCKET ELEVATORS, VERTICAL ELEVATORS
- (1) SAFETY PROCEDURES TO OBSERVE IN OPERATING THE EQUIPMENT
 - (2) OPERATING THE EQUIPMENT TO PREVENT DAMAGE TO THE SEEDS
 - (3) MAINTAINING AND SERVICING THE EQUIPMENT
- D. OPERATING EQUIPMENT IN THE SEED FIRM USED TO HANDLE BAGGED SEED OR SEED IN BINS SUCH AS FORK LIFTS AND BELT CONVEYORS
- (1) SAFETY PROCEDURES TO OBSERVE IN OPERATING THE EQUIPMENT
 - (2) OPERATING THE EQUIPMENT TO PREVENT DAMAGE TO THE SEED AND CONTAINERS
 - (3) MAINTAINING AND SERVICING THE EQUIPMENT
- E. PREPARING SEED STORAGE AREAS IN THE SEED FIRM
- (1) CLEANING STORAGE AREAS AND BINS BY COMPLETELY REMOVING SPILLED SEED AND OTHER DEBRIS
 - (2) USING A HEAVY DUTY VACUUM CLEANER TO CLEAN THE STORAGE AREAS
 - (3) CLEANING ALL PARTS OF ELEVATORS AND CONVEYORS
 - (4) BURNING, BURYING, OR HAULING AWAY ALL REFUSE AND CLEANINGS

F. CONTROLLING INSECTS, DISEASES, RODENTS, AND BIRDS
IN THE SEED STORAGE AREAS

- (1) APPLYING RESIDUAL SPRAYS TO CLEANED STORAGE AREAS TO KILL OUT ANY INFESTATION REMAINING IN THE AREAS AFTER CLEANING
- (2) APPLYING A PROTECTANT AS SEED GOES INTO STORAGE
- (3) APPLYING APPLICATIONS OF RESIDUAL SPRAYS OVER BAGGED SEED
- (4) RESIDUAL SPRAY APPLICATIONS ON THE SURFACE OF BULK-STORED SEEDS
- (5) FUMIGATING STORED SEEDS
- (6) DETERMINING WHAT CHEMICALS ARE APPROPRIATE TO USE AND MIXING AND SAFETY PRECAUTIONS TO FOLLOW

G. PREPARING EQUIPMENT USED TO SHIP GRAIN

- (1) INSPECTING THE TRUCK OR CAR FOR PROTUDING NAILS, BOLTS, AND SPLINTERED BOARDS THAT COULD CAUSE BAGS TO TEAR
- (2) INSPECTING FOR LEAKY ROOFS, LOOSE FITTING DOORS, AND WORN TARPS WHICH COULD RESULT IN WATER DAMAGE
- (3) INSPECTING THE TRUCK OR CAR FOR CHEMICALS AND OTHER RESIDUES WHICH MAY CONTAMINATE THE SEED
- (4) INSPECTING THE TRUCK OR CAR FOR LOOSE OR BROKEN WALL BOARDS OR FLOOR BOARDS WHICH COULD RESULT IN LOSE OF SEEDS DURING SHIPMENT
- (5) THOROUGHLY SWEEPING OUT THE TRUCK OR CAR TO REMOVE EXCESS DEBRIS
- (6) LINING THE CAR OR TRUCK WITH KRAFT PAPER

H. LOADING THE TRUCK OR CAR

- (1) STACKING BAGS OF SEED IN AN INTERLOCKING PATTERN
- (2) PLACEMENT OF LIGHT AND HEAVY BAGS AND CARTONS
- (3) SEALING THE DOOR ON RAIL CARS FOR BULK SHIPMENTS USING WOOD, HEAVY DUTY PAPERBOARD, AND STEEL STRAPPING
- (4) NOTES OF CAUTION ATTACHED TO THE TRUCKS OR RAIL CARS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS CLEAN STORAGE BINS BY SWEEPING ALL DEBRIS FROM THE AREA AND USE A HEAVY DUTY VACUUM TO REMOVE ANY REMAINING DEBRIS OR DUST.

2. HAVE THE STUDENTS OPERATE A FORK LIFT TO TRANSFER BAGGED SEED WHICH HAS BEEN STACKED ON PALLETS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. WHILE WORKING IN A SEED FIRM, HAVE THE STUDENTS CLEAN AND DISINFECT SEED STORAGE AREAS BY USING THE CHEMICALS DIRECTED BY THE EMPLOYER AND FOLLOWING MIXING DIRECTIONS AND SAFETY PROCEDURES DETAILED ON THE CHEMICAL CONTAINER LABEL.
2. HAVE THE STUDENTS OPERATE A FORK LIFT TO PICK UP, TRANSPORT, AND UNLOAD A PALLET OF BAGGED SEED. EVALUATE THE STUDENTS BY CONSIDERING WHETHER SAFE OPERATING PROCEDURES WERE FOLLOWED AS DETAILED IN THE OPERATOR'S MANUAL AND WHETHER BAGS WERE SPILLED FROM THE PALLET OR TORN OPEN.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SLIDES OR SAMPLES OF SEEDS WHICH HAVE NOT BEEN STORED PROPERLY
2. ACCESS TO COOPERATIVE WORK STATIONS IN A SEED FIRM OR A FIRM SELLING SEEDS
3. ACCESS TO TRUCKS OR RAIL CARS TO BE USED TO TRANSPORT SEED
4. FORK LIFT
5. KRAFT PAPER
6. BAGGED SEED
7. PALLETS
8. CHEMICALS AND LABELS FROM SUCH CHEMICAL CONTAINERS
9. HAND SPRAYER
10. GREASE, GREASE GUN, OIL, SPRING OILERS, AND SMALL HAND TOOLS

F. EXAMPLES OF SUPPORTING REFERENCES

1. OPERATOR'S MANUALS FOR THE VARIOUS EQUIPMENT USED IN HANDLING AND STORING SEEDS.

THESE REFERENCES MAY INCLUDE SAFE OPERATING PROCEDURES FOR THE VARIOUS EQUIPMENT AND MAINTENANCE AND SERVICE PRACTICES TO FOLLOW.

2. SEED PROCESSING AND HANDLING HANDBOOK NO. 1. STATE COLLEGE, MISSISSIPPI: SEED TECHNOLOGY LABORATORY, MISSISSIPPI STATE UNIVERSITY. 1968

AN EXCELLENT REFERENCE, TOPIC AREAS INCLUDED IN THIS PUBLICATION INCLUDE STORAGE AREAS AND THEIR PREPARATION AND THE OPERATION OF VARIOUS EQUIPMENT USED IN HANDLING AND STORING SEEDS.

3. SEEDS: THE YEARBOOK OF AGRICULTURE. WASHINGTON, D.C.: U.S. GOVERNMENT PRINTING OFFICE, THE SUPERINTENDENT OF DOCUMENTS. 1961, 591 PAGES.

INCLUDED IN THIS PUBLICATION ARE SECTIONS DEALING WITH SUCH TOPICS AS SHIPPING AND RECEIVING SEEDS, HANDLING BULK AND BAGGED SEEDS, PREPARING SEED STORAGE AREAS, CONTROL OF DISEASE AND INSECTS IN THE SEED STORAGE AREA, AND PREPARING SHIPPING VEHICLES.

QUALITY SEED PRODUCTION

UNIT CONCEPT: THE INCREASED USAGE OF QUALITY SEEDS BY FARMERS IN THE PRODUCTION OF CROPS HAS RESULTED IN INCREASED YIELDS AND INCREASED PROFITS FOR THE FARMER. THE EMPLOYEE IN A SEED FIRM WHO IS AWARE OF HOW THESE QUALITY SEEDS ARE PRODUCED MAY BE ABLE TO ANSWER FARMERS' QUESTIONS REGARDING SPECIFIC SEED VARIETIES.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PRESENTED THE TERMS "GOOD QUALITY SEED" AND "POOR QUALITY SEED," LIST FIVE FACTORS WHICH ARE USED TO DETERMINE WHETHER A SEED IS OF "POOR" OR "GOOD" QUALITY.
2. WHEN CONSIDERING THE PRODUCTION OF QUALITY SEED, DESCRIBE CORRECTLY AND TO THE SATISFACTION OF THE LOCAL TEACHER THE ROLE OF THE PLANT BREEDER, FOUNDATION SEED PRODUCER, THE CERTIFIED SEED PRODUCER, AND REGISTERED SEED PRODUCER.
3. PROVIDED SAMPLES OF SEEDS, PROPERLY IDENTIFY THE SEEDS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.

B. INSTRUCTIONAL AREAS

1. DETERMINING THE IMPORTANCE OF USING QUALITY SEEDS IN THE PRODUCTION PHASE OF FARM CROPS
 - A. IDENTIFYING FACTORS THAT WILL INFLUENCE THE CROP YIELDS SUCH AS:
 - (1) FERTILITY OF THE SOIL
 - (2) MOISTURE CONDITIONS
 - (3) SEED PLANTED
 - (4) FERTILIZATION AT TIME OF PLANTING
 - (5) WEED AND DISEASE CONTROL PRACTICES FOLLOWED
 - (6) LABOR AND MANAGEMENT
 - (7) OTHER FACTORS APPROPRIATE TO THE LOCAL SITUATION
 - B. DETERMINING WHAT IT COSTS TO USE QUALITY SEED AND WHAT THE RETURNS ARE
 - (1) COMPARING RELATIVE COSTS OF PRODUCING VARIOUS CROPS USING DIFFERENT QUALITY OF SEED

- (2) COMPARING THE RELATIVE RETURNS FROM VARIOUS CROPS USING DIFFERENT QUALITY OF SEED
- C. DETERMINING THE IMPORTANCE OF QUALITY SEEDS IN AGRICULTURE
 - (1) PRODUCTION OF GREATER YIELDS AND INCREASED PROFITS
 - (2) PROVIDE FOR THE SURVIVAL OF DESIRED SPECIES
 - (3) PROVIDE FOR THE EXPANDED PRODUCTION OF NEEDED CROP PRODUCTS
 - (4) OTHER BENEFITS DERIVED FROM THE USE OF QUALITY SEEDS
- 2. IDENTIFYING THE FACTORS THAT MAKE SEED "POOR" QUALITY SEED OR "GOOD" QUALITY SEED
 - A. DEGREE OF INFESTATION WITH WEED SEEDS
 - B. DEGREE OF RESISTANCE TO DISEASES AND INSECTS
 - C. PERCENTAGE OF GERMINATION
 - D. PERCENTAGE OF INERT MATTER
 - E. PERCENTAGE OF OTHER CROP SEEDS
 - F. DEGREE TO WHICH THE SEED IS ADAPTED TO THE LOCAL CLIMATIC AND GROWING CONDITIONS
 - G. GENETIC CAPABILITY FOR PRODUCING HIGH YIELDS
 - H. SOURCE OF THE SEED
 - I. SEED TREATMENT
 - J. OTHER FACTORS THAT INFLUENCE QUALITY
- 3. RECOGNIZING HOW HIGH QUALITY SEEDS ARE PRODUCED
 - A. IDENTIFYING THE VARIOUS SOURCES OF SEEDS AVAILABLE TO LOCAL FARMERS
 - B. DETERMINING HOW NEW VARIETIES OF SEED ARE PRODUCED
 - (1) CLASSIFYING PLANTS
 - (2) PROCESSES INVOLVED IN PLANT GROWTH AND SEED FORMATION
 - (3) METHODS USED BY PLANT BREEDERS IN DEVELOPING NEW VARIETIES SUCH AS:
 - (A) CROSS-POLLINATION

- (B) SELF-POLLINATION
- (C) PROGENY TESTING
- (D) BACK CROSSING
- (E) HYBRIDIZATION

- (4) PRODUCTION OF HYBRID SEED
- (5) PRODUCTION OF CERTIFIED SEED

- (A) BREEDERS SEED
- (B) FOUNDATION SEED
- (C) REGISTERED SEED
- (D) CERTIFIED SEED

C. DEFINING THE ROLE OF THE SEED IMPROVEMENT ASSOCIATION

- (1) KEEPS PEDIGREE RECORDS OF CROP VARIETIES
- (2) SUPERVISES THE INSPECTIONS OF FIELDS WHERE CERTIFIED SEEDS ARE PRODUCED
- (3) SUPERVISES THE HARVESTING AND CLEANING OF SEEDS PRODUCED FOR CERTIFICATION
- (4) SUPERVISES THE LABORATORY TESTS MADE OF ALL LOTS OF SEED PRODUCED AS CERTIFIED
- (5) SPONSORS EDUCATIONAL PROGRAMS FOR CERTIFIED SEED PRODUCERS AND FARMERS
- (6) PROVIDES AN EDUCATIONAL PROGRAM FOR THE PURPOSE OF INCREASING THE DISTRIBUTION AND USE OF CERTIFIED FEED

4. IDENTIFYING SEEDS AVAILABLE FOR CROPS COMMONLY GROWN IN THE LOCAL AREA

A. COMMON CROPS FOR WHICH SEEDS ARE AVAILABLE

(1) GRAINS SUCH AS:

- (A) CORN
- (B) WHEAT
- (C) OATS
- (D) GRAIN SORGHUM
- (E) OTHERS SPECIFIC TO THE LOCAL AREA

(2) COTTON

(3) GRASSES AND LEGUMES SUCH AS:

- (A) ALFALFA
- (B) CLOVERS
- (C) TIMOTHY
- (D) JOHNSON GRASS
- (E) OTHERS SPECIFIC TO THE LOCAL AREA

- (4) SOYBEANS
- (5) OTHER MAJOR GROUPS APPLICABLE TO THE LOCAL SITUATION

B. IDENTIFYING VARIOUS SEEDS BY EXAMINING EXTERNAL PHYSICAL CHARACTERISTICS SUCH AS:

- (1) SHAPE
- (2) SIZE
- (3) COLOR
- (4) SURFACE TEXTURE

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS BEGIN TO DEVELOP AN UNDERSTANDING OF "GOOD" QUALITY AND "POOR" QUALITY SEED BY SELECTING SOME OATS, SOYBEAN, OR WHEAT GRAIN FROM A FARM STORAGE BIN AS IT CAME FROM THE COMBINE. THE STUDENTS SHOULD THEN COMPARE THAT SAMPLE WITH A SAMPLE OF CERTIFIED SEED WHICH YOU CAN OBTAIN FROM A SEED DEALER OR FROM THE STATE SEED IMPROVEMENT ASSOCIATION. THE STUDENTS SHOULD COMPARE AND CONTRAST PHYSICAL QUALITY DIFFERENCES BETWEEN THE TWO SAMPLES.
2. HAVE THE STUDENTS DEVELOP A DETAILED CHART WHICH ILLUSTRATES THE PRODUCTION OF CERTIFIED SEED. IN THIS CHART THE STUDENTS SHOULD BE SURE TO ILLUSTRATE HOW BREEDERS SEED, FOUNDATION SEED, AND REGISTERED SEED IS A PART OF CERTIFIED SEED PRODUCTION.
3. HAVE THE STUDENTS COLLECT SAMPLES OF VARIOUS SEEDS FOR VARIOUS CROPS GROWN IN THE LOCAL AREA. THE STUDENTS SHOULD USE APPROPRIATE CONTAINERS AND LABELS TO IDENTIFY THE VARIOUS SEEDS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. DEVELOP AN OBJECTIVE EVALUATION EXERCISE WHEREIN THE STUDENTS ARE ASKED TO LIST FIVE FACTORS THEY WOULD CONSIDER WHEN EVALUATING THE QUALITY OF SEED.
2. DEVELOP A MATCHING EVALUATION EXERCISE THAT INCLUDES IN ONE COLUMN SUCH TERMS AS BREEDERS SEED, FOUNDATION SEED, REGISTERED SEED, AND CERTIFIED SEED. A SECOND COLUMN SHOULD CONTAIN APPROPRIATE DEFINITIONS FOR THE ABOVE MENTIONED TERMS. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.

3. PREPARE A SERIES OF SEED SAMPLES AND HAVE THE STUDENTS CORRECTLY IDENTIFY THE VARIOUS SEEDS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. BUDGETS SHOWING THE RELATIVE COSTS AND PROFITS FOR PRODUCING VARIOUS CROPS
2. SLIDES WHICH SHOW FIELDS WHERE "GOOD" QUALITY SEEDS AND "POOR" QUALITY SEEDS HAVE BEEN USED. THESE SLIDES MAY BE USED TO FOCUS UPON A SPECIFIC ASPECT OF QUALITY SEEDS SUCH AS DISEASE RESISTANCE.
3. SEED LABELS OR TAGS FOR THE STUDENTS TO INSPECT
4. SAMPLES OF VARIOUS SEEDS FOR THE STUDENTS TO IDENTIFY
5. CHARTS SHOWING THE VARIOUS PARTS OF PLANTS AND HOW SEEDS ARE PRODUCED
6. CHARTS SHOWING HOW HYBRID SEEDS ARE PRODUCED
7. JARS OR OTHER CONTAINERS FOR THE STUDENTS TO USE AS THEY COLLECT SAMPLES OF SEEDS
8. SEED IDENTIFICATION KIT

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRONOMY GUIDE. AVAILABLE FROM THE COOPERATIVE EXTENSION SERVICE.

GENERALLY THIS REFERENCE PROVIDES SUCH INFORMATION AS THE RELATIVE COST OF SEED IN PRODUCING FARM CROPS, FACTORS WHICH INFLUENCE THE YIELD OF CROPS, AND THE FACTORS TO BE CONSIDERED IN DETERMINING SEED QUALITY.

2. IF IT'S IN THE BAG - IT'S LISTED ON THE TAG! COLUMBUS, OHIO: OHIO SEED IMPROVEMENT ASSOCIATION. 4 PAGES.

THIS PAMPHLET COVERS IN A VERY CONCISE MANNER SEVERAL OF THE FACTORS THAT ARE CONSIDERED IN DETERMINING SEED QUALITY. STUDENTS WILL FIND THE MATERIAL EASY TO UNDERSTAND.

3. SEED DIRECTORY. AVAILABLE FROM YOUR STATE SEED IMPROVEMENT ASSOCIATION.

THIS ANNUAL PUBLICATION CONTAINS INFORMATION REGARDING ALL THE FACTORS THAT ARE CONSIDERED WHEN DETERMINING SEED QUALITY AND THE VARIOUS SOURCES OF SEEDS IN YOUR STATE.

4. SEED PRODUCTION OF CORN, SOYBEANS, AND SMALL GRAIN.
COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 88 PAGES.

THIS PUBLICATION WHICH IS DESIGNED AS A STUDENT STUDY MANUAL CONSIDERS THE IMPORTANCE OF THE SEED INDUSTRY, LOSSES FROM USING POOR SEED, HOW PLANTS PRODUCE SEEDS, AND PRODUCTION OF CERTIFIED SEED.

5. SEEDS: THE YEARBOOK OF AGRICULTURE. WASHINGTON, D.C.: U.S. GOVERNMENT PRINTING OFFICE, THE SUPERINTENDENT OF DOCUMENTS. 1961, 591 PAGES.

INCLUDED IN THIS GENERAL REFERENCE ARE SECTIONS WHICH FOCUS ON SUCH TOPIC AREAS AS THE IMPORTANCE OF SEEDS, HOW SEEDS ARE FORMED, THE LIFE PROCESSES OF SEEDS, THE PRODUCTION OF SEEDS, AND THE IDENTIFICATION OF SEEDS. THIS REFERENCE WILL BE USEFUL MAINLY TO THE TEACHER RATHER THAN THE STUDENT.

6. SOME IDENTIFYING CHARACTERISTICS OF 60 CROPS AND WEED SEEDS.
COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 16 PAGES.

THIS PUBLICATION WHICH IS DESIGNED FOR STUDENT USE, PROVIDES A BRIEF DESCRIPTION OF SOME OF THE MORE COMMON CROP AND WEED SEEDS. A FIFTY-SIX COLOR SLIDE AND SCRIPT TO ACCOMPANY THE PUBLICATION IS ALSO AVAILABLE.

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V

CHEMICALS

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UTILIZING CHEMICALS FOR AGRICULTURAL PROBLEMS

PREPARING CHEMICAL SOLUTIONS FOR AGRICULTURAL PURPOSES

APPLYING AGRICULTURAL CHEMICALS

OBSERVING SAFETY PRECAUTIONS IN HANDLING AGRICULTURAL CHEMICALS

UTILIZING CHEMICALS FOR AGRICULTURAL PROBLEMS

UNIT CONCEPT: CHEMICALS ARE SUPPLIED CUSTOMERS TO REDUCE OR MINIMIZE LOSSES AND INCREASE PRODUCTION AND PROFITS. THE EMPLOYEE IN A FIRM DISTRIBUTING CHEMICALS MAY BE ASKED BY CUSTOMERS TO SUGGEST APPROPRIATE CHEMICALS FOR VARIOUS PROBLEMS AND TO SUPPLY THE CUSTOMER WITH THESE CHEMICALS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. PROVIDED EXAMPLES OF DAMAGE AND/OR THE INSECT OR PEST CAUSING THE DAMAGE, ASSIST IN IDENTIFYING THE INSECT OR PEST AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL INSTRUCTOR.
2. PROVIDED EXAMPLES OF COMMON LOCAL WEEDS, ASSIST IN IDENTIFYING THE WEED AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
3. PROVIDED APPROPRIATE INFORMATION REGARDING THE PROBLEM TO BE CONTROLLED BY THE USE OF CHEMICALS, USE THE FIRMS TECHNICAL PUBLICATIONS TO LOCATE THE APPROPRIATE CHEMICAL(S) TO BE USED FOR A SPECIFIC SITUATION AS RECOMMENDED BY THE CHEMICAL COMPANY OR OTHER SOURCES SUCH AS THE COUNTY AGENT AND CALCULATE THE CORRECT AMOUNT OF CHEMICAL THE CUSTOMER NEEDS TO PURCHASE FOR A SPECIFIC SITUATION.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHY IT IS IMPORTANT TO CONTROL INSECTS, DISEASES, WEEDS, AND OTHER PESTS BY USING CHEMICALS
 - A. ECONOMIC LOSSES WHICH MAY OCCUR BECAUSE OF INSECTS, DISEASES, WEEDS, AND OTHER PESTS
 - (1) DECREASED YIELDS FROM CROPS
 - (2) DECREASED PRODUCTION FROM LIVESTOCK
 - (3) LOWERED QUALITY OF CROP AND LIVESTOCK PRODUCTS
 - (4) LOSSES OCCURRING IN STORAGE
 - (5) REDUCED VIGOR OF PLANTS AND ANIMALS
 - (6) REDUCED PROFITS AND INCREASED PRODUCTION COSTS
 - (7) DAMAGE TO BUILDINGS AND EQUIPMENT
 - (8) REDUCED LAND VALUES

- B. IDENTIFYING THE VARIOUS CLASSIFICATIONS OF AGRICULTURAL CHEMICALS AND HOW THEY WORK TO CONTROL INSECTS, DISEASES, WEEDS, AND OTHER PESTS
 - (1) INSECTICIDES
 - (2) HERBICIDES
 - (3) FUNGICIDES
 - (4) DEFOLIANTS
 - (5) GROWTH REGULATORS
 - (6) ATTRACTANTS AND REPELLENTS
 - (7) RODENTICIDES
 - C. DETERMINING THE VARIOUS FORMS IN WHICH CHEMICALS MAY BE APPLIED
 - (1) LIQUIDS
 - (2) EMULSIONS
 - (3) WETTABLE POWDERS
 - (4) GRANULAR FORMS
 - (5) DUSTS
 - (6) GASES
 - (7) BAITS
2. ASSISTING IN THE IDENTIFICATION OF COMMON INSECTS, DISEASES, WEEDS, AND OTHER PESTS THAT MAY BE CONTROLLED WITH CHEMICALS
- A. IDENTIFYING COMMON INSECTS THAT MAY BE CONTROLLED BY CHEMICALS
 - (1) PHYSICAL CHARACTERISTICS OF THE INSECTS
 - (2) TYPE OF DAMAGE DONE BY THE INSECT
 - B. IDENTIFYING COMMON WEEDS THAT MAY BE CONTROLLED BY CHEMICALS
 - (1) CLASSIFICATION OF WEEDS INTO ANNUALS, BIENNIALS, AND PERENNIALS
 - (2) PHYSICAL CHARACTERISTICS OF THE WEEDS
3. DETERMINING WHICH CHEMICALS ARE APPROPRIATE FOR SPECIFIC SITUATIONS
- A. FACTORS TO BE CONSIDERED IN SUGGESTING CHEMICALS APPROPRIATE FOR THE SITUATION
 - (1) IDENTIFYING THE PLANT, ANIMAL, OR MATERIAL BEING ATTACKED
 - (2) IDENTIFYING THE DAMAGE BEING DONE
 - (3) DETERMINING WHAT PEST IS CAUSING THE PROBLEM

B. SUGGESTING APPROPRIATE CHEMICALS AVAILABLE

- (1) USING THE FIRMS' TECHNICAL PUBLICATIONS TO IDENTIFY APPROPRIATE CHEMICALS
- (2) FOLLOWING CHEMICAL RECOMMENDATIONS SUPPLIED BY OTHER PERSONS SUCH AS THE COUNTY AGENT, VETERINARIAN, ETC.

4. PROVIDING THE CUSTOMER WITH APPROPRIATE INFORMATION REGARDING THE USE OF THE CHEMICAL

A. DETERMINING THE AMOUNT OF CHEMICAL TO APPLY

- (1) READING THE LABEL ON THE CHEMICAL CONTAINER FOR APPLICATION INFORMATION
- (2) USING LISTS IN THE CHEMICAL COMPANY'S TECHNICAL PUBLICATION WHICH GIVE APPLICATION RATES
- (3) USING COMPATIBILITY CHARTS
- (4) CALCULATING THE AMOUNT OF CHEMICAL TO PURCHASE FOR A SPECIFIC SITUATION

B. PROVIDING INFORMATION REGARDING THE PROPER TIME OF APPLICATION

- (1) PRE-PLANTING, PRE-EMERGENCE, POST-EMERGENCE
- (2) RESIDUAL BUILD-UP OF VARIOUS CHEMICALS
- (3) WEATHER CONDITIONS

C. METHODS FOR APPLYING THE CHEMICALS

- (1) SPRAYING
- (2) DUSTING
- (3) FOGGING
- (4) FUMIGATING

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. HAVE THE STUDENTS COLLECT A NUMBER OF DIFFERENT INSECTS THAT ARE IMPORTANT PESTS TO FARMERS IN THE LOCAL AREA AND IDENTIFY THE VARIOUS INSECTS.
- 2. HAVE THE STUDENTS TAKE A FIELD TRIP TO A LOCAL FARM AND IDENTIFY VARIOUS WEEDS THAT ARE GROWING IN THE FIELDS.
- 3. USING A SPECIFIED CHEMICAL, HAVE THE STUDENT CALCULATE HOW MANY POUNDS OF AN 80% WETTABLE POWDER INSECTICIDE ARE NEEDED TO SUPPLY TWO POUNDS OF ACTUAL INSECTICIDE.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH INFORMATION REGARDING THE PEST DOING DAMAGE ON A SPECIFIC CROP. HAVE THE STUDENTS USE TECHNICAL PUBLICATIONS OR CHEMICAL LABELS TO IDENTIFY TWO CHEMICALS THAT MAY BE USED TO CONTROL THE INSECT.
2. PRESENT THE STUDENTS WITH A SERIES OF WEEDS COMMON TO THE LOCAL AREA. HAVE THE STUDENTS IDENTIFY THE WEEDS AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
3. PRESENT THE STUDENTS WITH A PROBLEM THAT REQUIRES THE APPLICATION OF A SPECIFIC CHEMICAL FOR A SPECIFIC CROP ACREAGE. USING THE MIXING DIRECTIONS CONTAINED ON THE LABEL, HAVE THE STUDENTS DETERMINE THE CORRECT AMOUNT OF CHEMICALS THE FARMER WILL NEED TO PURCHASE.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. SLIDES OR ACTUAL PLANT AND LIVESTOCK SPECIMENS SHOWING DAMAGE CAUSED BY INSECTS, PESTS AND DISEASES ON AGRICULTURAL LIVESTOCK AND CROPS
2. SLIDES OR ACTUAL SPECIMENS OF INSECTS, WEEDS AND OTHER PESTS CAUSING LOSSES IN AGRICULTURAL PRODUCTS
3. CHEMICAL FIRM TECHNICAL MANUALS AND RATES OF APPLICATION CHARTS SHOWING THE AMOUNT OF ACTIVE INGREDIENTS
4. CONTAINERS WITH THE VARIOUS TYPES OF CHEMICAL FORMULATIONS
5. COMPATIBILITY CHARTS
6. LABELS FROM CHEMICAL CONTAINERS

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL CHEMICALS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, PP. 1-34.

A STUDENT MANUAL, THIS REFERENCE APPLIES MORE DIRECTLY TO THE STUDENT WHO IS EMPLOYED IN THE AGRICULTURAL SUPPLY FIRM THAT IS INVOLVED IN SELLING CHEMICALS. COVERED ARE SUCH AREAS AS THE CLASSIFICATION OF CHEMICALS AND THE VARIOUS FORMULATIONS OF CHEMICALS ALONG WITH SUGGESTED STUDENT EXERCISES.

2. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

INCLUDED IN THE INFORMATION PROVIDED IS A PROCEDURE FOR CALCULATING THE AMOUNT OF CHEMICAL MATERIAL NEEDED TO APPLY A CERTAIN AMOUNT OF ACTIVE INGREDIENT. IT COVERS HERBICIDE RECOMMENDATIONS IN DETAIL FOR VARIOUS CROPS AND WEEDS WITH DETAILED INFORMATION ON THE AMOUNT OF ACTIVE INGREDIENTS, THE MIXING OF THE CHEMICALS, AND SPECIAL PRECAUTIONS FOR USE OF THE CHEMICAL.

3. AGRONOMY KIT. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 124 PICTURES.

INCLUDED IN THE KIT ARE 124 PICTURES OF PLANTS, WEEDS AND SEEDS MOST COMMONLY FOUND IN THE UNITED STATES.

4. INSECTICIDES. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1973, PP. 1-30.

FOCUSING STRICTLY UPON INSECTICIDES AS APPLIED TO AGRICULTURE, THIS STUDENT REFERENCE COVERS THE VARIOUS MEANS BY WHICH INSECTICIDES DESTROY OR CONTROL INSECTS. THE DIFFERENT FORMULATIONS OF INSECTICIDES AND A PROCEDURE FOR DETERMINING THE AMOUNT OF MATERIAL NEEDED TO APPLY A CERTAIN AMOUNT OF ACTIVE INGREDIENT ARE DISCUSSED.

5. JAQUES, H.E. HOW TO KNOW THE WEEDS. DUBUQUE, IOWA: WILLIAM C. BROWN COMPANY PUBLISHERS. 1972, 232 PAGES.

PRESENTED IN THIS PUBLICATION IS A KEY FOR THE IDENTIFICATION OF WEEDS AND ILLUSTRATIONS OF THE WEED, FLOWER, AND SEED. A BRIEF ANNOTATION ACCOMPANYS EACH ILLUSTRATION.

PREPARING CHEMICAL SOLUTIONS FOR AGRICULTURAL PURPOSES

UNIT CONCEPT: THE EMPLOYEE IN A CUSTOM SPRAYING SERVICE OR IN THE AGRIBUSINESS SUPPLY AND SERVICE FIRM WHO CAN ASSIST THE CUSTOMER BY INTERPRETING THE RECOMMENDATIONS ON THE LABEL OF THE CHEMICAL CONTAINER REGARDING THE PREPARATION AND MIXING OF CHEMICALS FOR A SPECIFIC PURPOSE, WILL AID IN PREVENTING CHEMICAL INJURY TO PLANTS, LIVESTOCK OR MAN, YET EFFECTIVELY CONTROL THE INSECT, DISEASE OR WEED.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN USING CHEMICAL LABELS, SPRAY COMPATIBILITY CHARTS, AND TECHNICAL REFERENCES FROM THE CHEMICAL FIRM, CALCULATE THE CORRECT AMOUNT OF CARRIER AND CHEMICAL TO MIX WHEN THE CHEMICAL NEEDS TO BE MIXED FOR A GIVEN SITUATION.
2. WHEN MIXING CHEMICALS, DETERMINE WHAT MATERIALS MAY BE MIXED TOGETHER AS SPECIFIED BY A COMPATIBILITY CHART OR AS SPECIFIED ON THE LABEL.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHY IT IS IMPORTANT TO MIX CHEMICALS PROPERLY
 - A. EFFECTS OF MIXING TOO STRONG A CHEMICAL MIXTURE OR APPLYING TOO MUCH OF A STRAIGHT CHEMICAL
 - (1) PHYSICAL DAMAGE WHICH MAY OCCUR
 - (2) ECONOMIC LOSSES WHICH MAY RESULT
 - B. EFFECTS OF TOO WEAK A SOLUTION BEING APPLIED
 - C. EFFECTS OF APPLYING A MIXTURE WHICH IS COMPOSED OF NONCOMPATIBLE MATERIALS
2. DETERMINING WHAT MATERIALS MAY BE MIXED
 - A. DETERMINING HOW MIXING OF CHEMICALS MAY INFLUENCE THEIR EFFECTIVE USE
 - (1) INFLUENCE ON RESIDUE AND TOLERANCE LEVELS
 - (2) INFLUENCE ON SAFETY TO THE PERSON
 - (3) INFLUENCE ON SEPARATION OF THE CHEMICALS OR INTERACTION OF THE CHEMICALS

- B. OBTAINING COMPATIBILITY INFORMATION FROM THE LABELS ON THE CHEMICAL CONTAINERS
- C. OBTAINING COMPATIBILITY INFORMATION FROM THE FIRM'S TECHNICAL PUBLICATIONS
- D. INTERPRETING COMPATIBILITY CHARTS

3. MIXING THE CHEMICAL MATERIALS

- A. WEIGHTS MEASURES, AND CONVERSION TABLES USEFUL FOR MIXING CHEMICAL SOLUTIONS
- B. DETERMINING THE AMOUNT OF CARRIER NEEDED FOR A SPECIFIC SITUATION
- C. DETERMINING THE AMOUNT OF CHEMICALS NEEDED FOR PREPARING A SPECIFIC SOLUTION
 - (1) FACTORS WHICH INFLUENCE THE AMOUNT OF MATERIALS TO MIX
 - (2) USING MIXING INSTRUCTIONS FROM THE LABELS
 - (3) USING CHARTS AND FORMULATION TABLES
 - (4) CALCULATING THE AMOUNT OF CHEMICAL NEEDED FOR A GIVEN AMOUNT OF ACTIVE CHEMICALS PER ACRE OR PERCENTAGES OF ACTIVE CHEMICAL

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

- 1. USING STUDENTS IN A ROLE-PLAYING EXERCISE AND CHEMICAL LABELS AND TECHNICAL REFERENCES, HAVE THE STUDENTS SIMULATE A SITUATION WHERE A CUSTOMER COMES INTO THE AGRI-BUSINESS SUPPLY FIRM AND DESIRES TO APPLY A CHEMICAL SUCH AS NIRON TO CONTROL APHIDS IN ALFALFA. THE STUDENT ACTING AS THE SALESMAN SHOULD ASSIST THE CUSTOMER IN DECIDING THE CARRIER TO USE AND THE AMOUNT OF CHEMICAL TO MIX WITH THE CARRIER.
- 2. PRESENT THE STUDENTS WITH SEVERAL CHEMICALS TO BE MIXED WITH VARIOUS CARRIERS. THE TEACHER WILL NEED TO BE SELECTIVE WHEN CONSIDERING THE CHEMICALS TO BE USED. HAVE THE STUDENTS PREPARE SEVERAL SMALL CHEMICAL SOLUTIONS AND OBSERVE THE CHARACTERISTICS OF COMPATIBLE AND NONCOMPATIBLE CHEMICALS AND CARRIERS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

- 1. PRESENT THE STUDENTS WITH SPECIFIC INFORMATION REGARDING THE CHEMICAL(S) TO BE USED, THE CARRIER TO BE USED, THE CROP ON WHICH THE CHEMICAL SOLUTION IS TO BE APPLIED,

THE TIME OF APPLICATION, AND THE AMOUNT OF ACREAGE TO BE COVERED. HAVE THE STUDENTS USE FORMULATION CHARTS OR CHEMICAL LABELS TO DETERMINE THE CORRECT AMOUNT OF CHEMICAL AND CARRIER TO BE MIXED.

2. PRESENT THE STUDENTS WITH A LIST OF PROPOSED CHEMICAL SOLUTIONS TO VARIOUS CROPS. HAVE THE STUDENTS USE TECHNICAL INFORMATION, CHEMICAL LABELS, AND/OR COMPATIBILITY CHARTS TO DETERMINE WHICH SOLUTIONS ARE COMPATIBLE OR NONCOMPATIBLE. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. CHEMICAL LABELS
2. SAMPLES OF COMMON CARRIERS
3. CONVERSION CHARTS
4. FORMULATION CHARTS AND TABLES
5. COMPATIBILITY CHARTS
6. CHEMICALS

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL CHEMICALS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 9 PAGES.

INCLUDED IN THIS STUDENT MANUAL ARE SECTIONS WHICH DEAL WITH FACTORS WHICH INFLUENCE THE AMOUNT OF CHEMICALS TO MIX, CONVERSION CHARTS, AND PROBLEMS FOR THE STUDENTS TO WORK REGARDING THE MIXING OF CHEMICAL SOLUTIONS.

2. AGRICULTURAL CHEMICALS EMPLOYEE. COLLEGE STATION, TEXAS: DEPARTMENT OF AGRICULTURAL EDUCATION, TEXAS A & M UNIVERSITY. PP. IV-3, V-1 - V-3.

INCLUDED IN THIS COURSE OUTLINE FOR THE AGRICULTURAL CHEMICALS EMPLOYEE ARE SUGGESTED REFERENCES, SUGGESTED STUDY QUESTIONS, AND INFORMATION SHEETS REGARDING THE MIXING OF AGRICULTURAL CHEMICALS.

3. AGRONOMY GUIDE. AVAILABLE FROM YOUR COOPERATIVE EXTENSION SERVICE.

INCLUDED IN THIS PUBLICATION ARE SECTIONS WHICH DISCUSS THE FACTORS WHICH AFFECT THE RESULTS OF HERBICIDES, HERBICIDE FORMULATIONS, AND TABLES WHICH INDICATE HERBICIDES AND MIXTURES OF HERBICIDES FOR VARIOUS CROPS.

4. CHEMICAL COMPATIBILITY CHART. AVAILABLE FROM MEISTER PUBLISHING COMPANY, WILLOUGHBY, OHIO.

A COLORED COMPATIBILITY CHART IS AVAILABLE FOR STUDENT USE IN ADDITION TO THEIR JOURNAL AGRI-FIELDMAN.

5. FARM CHEMICALS HANDBOOK. WILLOUGHBY, OHIO: MEISTER PUBLISHING COMPANY. 1974, 470 PAGES.

INCLUDED IN THIS PUBLICATION ARE SECTIONS WHICH DEAL WITH PREPARATION OF CHEMICAL SOLUTIONS, COMPATIBILITY CHARTS, AND A DESCRIPTION OF APPROPRIATE USES FOR VARIOUS CHEMICALS.

APPLYING AGRICULTURAL CHEMICALS

UNIT CONCEPT: THE EMPLOYEE IN A CUSTOM SPRAYING FIRM WHO IS CAPABLE OF PREPARING THE EQUIPMENT FOR APPLYING THE CHEMICAL AND MAINTAINING SUCH EQUIPMENT WILL MINIMIZE WEAR ON THE APPLICATION EQUIPMENT AND THUS INCREASE THE FIRM'S PROFITS.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. USING CHEMICAL APPLICATION EQUIPMENT COMMONLY USED BY CUSTOM SPRAYING SERVICES, CALIBRATE THE EQUIPMENT BY FOLLOWING APPROVED PROCEDURES IN THE OPERATOR'S MANUAL.
2. WHEN EMPLOYED IN A CUSTOM SPRAYING SERVICE, OPERATE THE EQUIPMENT ACCORDING TO DIRECTIONS IN THE OPERATOR'S MANUAL AND TO THE SATISFACTION OF THE EMPLOYER.
3. USING CHEMICAL APPLICATION EQUIPMENT COMMONLY USED BY CUSTOM SPRAYING SERVICES, MAINTAIN THE EQUIPMENT AND CLEAN AND FLUSH THE TANK, HOSES, AND NOZZLES AS DIRECTED IN THE OPERATOR'S MANUALS.

B. INSTRUCTIONAL AREAS

1. DETERMINING WHEN TO APPLY THE CHEMICAL MATERIALS
 - A. USING TECHNICAL INFORMATION TO DETERMINE WHEN TO APPLY SPECIFIC CHEMICALS
 - B. ENVIRONMENTAL FACTORS WHICH WILL INFLUENCE THE APPLICATION OF CHEMICALS
 - C. SOIL CONDITIONS WHICH WILL INFLUENCE THE APPLICATION OF CHEMICALS
2. IDENTIFYING THE EQUIPMENT TO BE USED FOR APPLYING THE CHEMICALS SUCH AS SPRAYERS
 - A. DETERMINING THE IMPORTANCE OF HAVING A PROPERLY OPERATING ITEM OF EQUIPMENT FOR APPLYING CHEMICALS
 - B. IDENTIFYING THE VARIOUS TYPES OF APPLICATION EQUIPMENT

- (1) SPRAYING EQUIPMENT
 - (2) DUSTING EQUIPMENT
 - (3) FOGGING EQUIPMENT
 - (4) FUMIGATING EQUIPMENT
- C. COMPONENTS OF APPLICATION EQUIPMENT SUCH AS A SPRAYER AND THEIR PURPOSE
- (1) PUMP
 - (2) TANK AGITATORS
 - (3) FILTERS
 - (4) PRESSURE REGULATORS
 - (5) PRESSURE GAUGES
 - (6) NOZZLES
 - (7) DROP PIPES
 - (8) BOOMS
3. PREPARING THE EQUIPMENT SUCH AS A SPRAYER, TO BE USED FOR APPLYING THE CHEMICALS
- A. CHECKING THE SPRAYER PUMP BY HAND TO BE SURE IT IS NOT STUCK
 - B. REMOVING NOZZLES AND FLUSHING THE NOZZLES
 - C. FLUSHING THE SPRAY LINES
 - D. CLEANING ALL FILTER SCREENS, PUMP SECTIONS, MAIN DELIVERY LINES, AND NOZZLES
 - E. REPLACING FILTERS THAT ARE CORRODED OR DAMAGED
 - F. REASSEMBLING ALL PARTS
 - G. CHECKING THE OUTPUT OF EACH NOZZLE ON THE SPRAYER
 - H. CALIBRATING THE SPRAYER BY VARIOUS METHODS
4. MIXING THE CHEMICAL MATERIALS TO BE USED
- A. OBSERVING ANY SPECIAL SAFETY PRECAUTIONS FOR WORKING WITH THE CHEMICAL AS OUTLINED ON THE LABEL
 - B. MIXING THE CHEMICAL AND CARRIER ACCORDING TO THE INSTRUCTIONS
5. APPLYING THE CHEMICAL MIXTURE
- A. ADJUSTING THE SPRAY RATE

- (1) CONSIDERING FACTORS WHICH INFLUENCE SPRAY RATE
SUCH AS GROUND SPEED, PRESSURE, NOZZLE SIZE
- (2) INCREASING SPRAY RATE
- (3) DECREASING SPRAY RATE

B. OPERATING PROCEDURES IN THE FIELD TO GET COVERAGE

- (1) ADJUSTING NOZZLE HEIGHT
- (2) OPERATING THE EQUIPMENT TO AVOID MISSED STRIPS
OR HEAVY OVERLAPS

C. COMPLETING APPROPRIATE CHEMICAL APPLICATION REPORT
FORMS USED BY CUSTOM SPRAYING SERVICES

6. CLEANING THE CHEMICAL APPLICATION EQUIPMENT AND PREPARING
THE EQUIPMENT FOR STORAGE

- A. USING ANY SPECIAL MIXTURES TO CLEAN THE SPRAYER OR
OTHER CHEMICAL APPLICATION EQUIPMENT
- B. FLUSHING THE APPLICATION EQUIPMENT
- C. FOLLOWING THE OPERATOR'S MANUAL IN PREPARING THE
EQUIPMENT FOR STORAGE

7. FOLLOWING APPROVED MAINTENANCE PROCEDURES FOR THE EQUIP-
MENT

- A. ADJUSTING VARIOUS PARTS
- B. GREASING AND OILING ACCORDING TO THE DIRECTIONS
IN THE OPERATOR'S MANUALS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. HAVE THE STUDENTS CALIBRATE SPRAYING EQUIPMENT BY DETER-
MINING THE AMOUNT OF SPRAY APPLIED IN A FRACTION OF AN
ACRE AND THEN DETERMINE HOW MUCH WOULD BE APPLIED FOR
THE ENTIRE ACRE.
2. HAVE THE STUDENTS OPERATE SPRAYING EQUIPMENT IN THE
FIELD PAYING PARTICULAR ATTENTION TO WHAT INFLUENCE
THE RATE OF FORWARD SPEED HAS ON THE SPRAY RATE.
3. USING A TRACTOR MOUNTED SPRAYER, THE OPERATOR'S MANUAL,
WATER, CLEANING AGENTS, HOSE AND OIL, CLEAN THE SPRAYER
AND PREPARE IT FOR STORAGE BY FLUSHING THE TANK, DIS-
CONNECTING HOSES, COVERING BARE METAL PARTS WITH OIL,
AND STORING THE NOZZLES IN OIL.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH APPROPRIATE INFORMATION REGARDING THE AMOUNT OF SPRAY MATERIAL COLLECTED FOR A FRACTION OF AN ACRE. HAVE THE STUDENTS CORRECTLY CALCULATE THE AMOUNT OF MATERIAL THAT WAS BEING APPLIED PER ACRE AND USE A REFERENCE TO DETERMINE IF THIS IS THE CORRECT AMOUNT TO BE APPLIED.
2. PRESENT THE STUDENTS WITH A "TRUE OR FALSE" EXERCISE REGARDING THE ADJUSTMENT OF SPRAY RATE. THE STATEMENTS SHOULD INDICATE PROPOSED PROCEDURES THAT THE OPERATOR MAY FOLLOW TO ALTER APPLICATION RATE. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ACCEPTABLE TO THE LOCAL TEACHER.
3. HAVE THE STUDENT CLEAN AND FLUSH THE SPRAYER UNIT. EVALUATE THE STUDENTS BY CONSIDERING WHETHER THE PROCEDURES DETAILED IN THE OPERATOR'S MANUAL WERE FOLLOWED.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. CHEMICAL CONTAINERS WITH LABELS
2. COMPLETELY EQUIPPED TRACTOR MOUNTED SPRAYER AND OPERATOR'S MANUAL
3. CARRIERS USED TO APPLY CHEMICALS
4. HOUSEHOLD AMMONIA, WATER AND OIL TO BE USED IN CLEANING AND PREPARING THE SPRAYER FOR STORAGE
5. PLASTIC CONTAINERS TO CHECK THE FLOW OF THE NOZZLES
6. ACCESS TO A COOPERATIVE WORK STATION IN A CUSTOM SPRAYING SERVICE
7. CONTAINERS TO BE USED IN CALIBRATING
8. STEEL TAPE
9. REPORT FORMS USED BY LOCAL CUSTOMER SPRAYING SERVICES

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL CHEMICALS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 9 PAGES.

A STUDENT MANUAL, THIS PUBLICATION COVERS THE VARIOUS FACTORS THAT INFLUENCE THE TIMING OF CHEMICAL APPLICATIONS, THE VARIOUS FORMS OF CHEMICALS THAT MAY BE APPLIED, AND THE OPERATION OF SPRAYING EQUIPMENT AND GRANULAR APPLICATION EQUIPMENT. VARIOUS STUDENT EXERCISES ARE PRESENTED ON SUCH TOPICS AS PREPARATION OF SPRAYING EQUIPMENT, CALIBRATION OF SPRAYING EQUIPMENT, OPERATION OF SPRAYING EQUIPMENT AND CLEANING OF SPRAYING EQUIPMENT.

2. AGRICULTURAL CHEMICALS - HERBICIDES. LESSON 4, HERBICIDE APPLICATION EQUIPMENT. BLACKSBURG, VIRGINIA: AGRICULTURAL EDUCATION DEPARTMENT, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY. 1970, 15 PAGES.

INTENDED TO BE LESSONS FOR TEACHERS TO USE, INCLUDED IN THE PUBLICATION ARE SECTIONS ON THE TYPES OF APPLICATION EQUIPMENT, THE BASIC COMPONENTS OF THE SPRAYER SYSTEM, CALIBRATING THE EQUIPMENT, AND CLEANING THE EQUIPMENT. ADDITIONALLY, SEVERAL PROBLEMS REGARDING THE CALIBRATION OF EQUIPMENT ARE PRESENTED.

3. AGRICULTURAL SUPPLIES. MONTGOMERY, ALABAMA: STATE DEPARTMENT OF EDUCATION, AGRICULTURAL EDUCATION SERVICE. 154 PAGES.

INCLUDED IN THIS STUDENT STUDY GUIDE ARE STUDENT EXERCISES COVERING THE TOPIC OF CALIBRATING THE SPRAYER.

4. INSECTICIDES. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1973, PP. 7-20, 29-43.

A STUDENT REFERENCE, THIS PUBLICATION COVERS IN DETAIL THE OPERATION OF SPRAYING EQUIPMENT. A SECTION IS INCLUDED WHICH DISCUSSES THE ADJUSTMENT OF SPRAY RATE AND DETERMINING THE SPEED OF TRAVEL. STUDENT EXERCISES ARE PRESENTED THROUGHOUT THE REFERENCE.

5. OPERATOR'S MANUALS FOR SPRAYERS.

THESE REFERENCES WILL INCLUDE OPERATING INSTRUCTIONS FOR THE SPRAYING EQUIPMENT AND OTHER CHEMICAL APPLICATION EQUIPMENT ALONG WITH STORAGE INSTRUCTIONS.

OBSERVING SAFETY PRECAUTIONS IN HANDLING AGRICULTURAL CHEMICALS

UNIT CONCEPT: THE EMPLOYEE IN THE AGRICULTURAL BUSINESS SELLING CHEMICALS OR THE EMPLOYEE IN THE AGRICULTURAL CUSTOM SPRAYING SERVICE INVOLVED IN SELLING AND APPLYING CHEMICALS MUST BE AWARE OF SAFETY PRECAUTIONS TO BE OBSERVED WHEN USING A SPECIFIC CHEMICAL IN ORDER TO AVOID PERSONAL INJURY AS WELL AS DAMAGE TO CROPS AND LIVESTOCK.

A. STUDENT PERFORMANCE OBJECTIVES

THE STUDENT SHOULD BE ABLE TO:

1. WHEN PROVIDED A CHEMICAL LABEL, CORRECTLY INTERPRET ALL INFORMATION CONTAINED ON THAT LABEL.
2. WHEN PROVIDED EMPTY CHEMICAL CONTAINERS, DISPOSE OF THOSE CONTAINERS ACCORDING TO THE DIRECTIONS ON THE CHEMICAL LABEL.
3. USING ACCIDENT REPORT FORMS USED BY A CUSTOM SPRAYING SERVICE, CORRECTLY COMPLETE SUCH FORMS BY SUPPLYING THE CORRECT INFORMATION REQUESTED ON THE FORM.

B. INSTRUCTIONAL AREAS

1. OBTAINING AND USING INFORMATION REGARDING THE SAFE HANDLING OF AGRICULTURAL CHEMICALS

A. READING THE LABEL

- (1) NAME OF MANUFACTURER
- (2) NAME OF PRODUCT
- (3) ACTIVE CHEMICAL INGREDIENTS AND PERCENTAGES
- (4) THE TYPE OF PESTICIDE, OR WHAT THE PRODUCT DOES (INSECTICIDE AND FUNGICIDE)
- (5) RECOMMENDATIONS FOR SPECIFIC USE
- (6) STORAGE PRECAUTIONS
- (7) DISPOSAL OF CHEMICAL CONTAINERS
- (8) PERSONAL PRECAUTIONS AND SIGNAL WORDS USED ON LABELS

- (A) DANGER
- (B) POISON
- (C) WARNING
- (D) CAUTION

(9) PRECAUTIONS IF THE INSECTICIDE IS TOXIC TO HUMANS AND ANIMALS

- B. USING TECHNICAL PUBLICATIONS FROM CHEMICAL FIRMS TO LOCATE SAFETY PRECAUTIONS AND PROCEDURES TO FOLLOW
 - C. USING STATE AND FEDERAL LAWS AND REGULATIONS FOR DETERMINING SPECIAL SAFETY PRECAUTIONS AND PROCEDURES TO FOLLOW
 - D. USING VARIOUS TECHNIQUES FOR MAKING CUSTOMERS AWARE OF SAFETY PROCEDURES TO FOLLOW
 - E. GENERAL FIRST AID PRACTICES WHEN WORKING WITH CHEMICAL POISONING
 - (1) BASIC FIRST AID PRACTICES TO FOLLOW
 - (2) CALLING THE PHYSICIAN
 - (3) LOCATING THE POISON CONTROL CENTER
2. OBSERVING SAFETY PRECAUTIONS IN PREPARING CHEMICALS
- A. DETERMINING APPROPRIATE PROTECTIVE CLOTHING THAT IS NEEDED
 - B. DETERMINING WHAT SPECIAL PREPARATION AND MIXING PROCEDURES ARE TO BE OBSERVED
3. OBSERVING SAFETY PRECAUTIONS IN APPLYING CHEMICALS
- A. DETERMINING THE APPROPRIATE PROTECTIVE CLOTHING THAT IS NEEDED
 - B. DETERMINING WHAT SAFETY PROCEDURES NEED TO BE OBSERVED IN APPLYING CHEMICALS, SUCH AS OPERATING THE EQUIPMENT TO MINIMIZE DRIFT
 - C. DETERMINING WHAT SAFETY PRACTICES SHOULD BE FOLLOWED TO AVOID RESIDUE BUILD-UP
4. OBSERVING SAFETY PRECATUIONS AFTER THE USE OF A CHEMICAL
- A. DISPOSING OF UNWANTED CHEMICALS
 - B. DISPOSING OF UNWANTED CHEMICAL CONTAINERS
 - C. FOLLOWING APPROPRIATE PROCEDURES IN CLEANING UP THE AREAS WHERE CHEMICALS WERE MIXED AND/OR SPILLED

- D. FOLLOWING APPROPRIATE PROCEDURES IN PERSONAL CLEAN UP AFTER HANDLING CHEMICALS
- 5. OBSERVING SAFETY PRECAUTIONS IN STORING CHEMICALS
 - A. STORING THE CHEMICALS IN APPROPRIATELY LABELED CONTAINERS
 - B. IDENTIFYING THE SAFEST AREAS TO STORE CHEMICALS
 - C. CHECKING THE STORED CHEMICALS PERIODICALLY
- 6. LOCAL, STATE, AND FEDERAL REGULATIONS INVOLVED IN THE SUPPLYING AND/OR APPLYING OF AGRICULTURAL CHEMICALS
 - A. IDENTIFYING THE VARIOUS LAWS AND REGULATIONS THAT PERTAIN SUCH AS ECONOMIC POISONS LAWS AND PESTICIDE USE AND APPLICATOR LAWS
 - B. RESPONSIBILITIES INVOLVED BY THOSE RECOMMENDING AND SELLING CHEMICALS
 - C. REGULATIONS PERTAINING TO APPLICATORS
 - (1) APPLICATOR'S LICENSE
 - (2) OPERATOR'S LICENSE
 - (3) RECORDS TO BE KEPT BY APPLICATORS
 - (A) APPLICATOR'S NAME AND ADDRESS
 - (B) CUSTOMER'S NAME AND ADDRESS
 - (C) DATE OF APPLICATION
 - (D) TYPE OF CROP, PLANTS, ANIMALS TREATED
 - (E) PRINCIPAL PESTS CONTROLLED
 - (F) ACREAGE OR NUMBER OF ANIMALS TREATED
 - (G) LOCATION OF TREATMENT AREA
 - (H) BRAND NAME OF CHEMICAL USED
 - (I) TOTAL AMOUNT OF CHEMICAL USED
 - (J) RATE OF APPLICATION
 - (K) TYPE OF APPLICATION METHOD
 - (L) TIME OF APPLICATION AND OTHER ENVIRONMENTAL CONDITIONS
 - (M) OTHER SPECIFICS REQUIRED IN YOUR AREA
 - D. COMPLETING APPROPRIATE ACCIDENT REPORT FORMS
 - E. PENALTY FOR VIOLATIONS OF RULES AND REGULATIONS

C. EXAMPLES OF STUDENT LEARNING ACTIVITIES

1. A. USING CHEMICAL LABELS, OTHER TECHNICAL INFORMATION FROM THE CHEMICAL FIRM, AND STUDENTS ACTING AS A SALESMAN AND CUSTOMERS, HAVE THE STUDENTS ROLE PLAY A DEMONSTRATION IN WHICH THE SALESMAN EXPLAINS TO THE CUSTOMER THE PRECAUTIONS AND PROCEDURES TO FOLLOW IN USING A CHEMICAL.

B. USING A TAPE RECORDER AND CHEMICAL LABELS, HAVE THE STUDENTS PREPARE A BRIEF PANEL DISCUSSION ON THE IMPORTANCE OF READING LABELS FOR SAFETY PRECAUTIONS THAT COULD BE PRESENTED AS A RADIO PROGRAM BY THE LOCAL VOCATIONAL AGRICULTURE CLASS.
2. HAVE THE STUDENTS DISPOSE OF SEVERAL CHEMICAL CONTAINERS AS DESCRIBED BY THE INSTRUCTIONS ON THE CHEMICAL LABEL.
3. USING SEVERAL OF THE ACCIDENT REPORT FORMS USED BY A CUSTOM SPRAYING SERVICE, HAVE THE STUDENTS CORRECTLY COMPLETE THE FORM BY PROVIDING THE INFORMATION REQUESTED ON THE GENERAL FORM AND ANY ADDITIONAL INFORMATION REQUESTED ON SPECIFIC FORMS FOR PLANTS OR ANIMALS.

D. EXAMPLES OF PROCESSES TO EVALUATE STUDENT PERFORMANCE

1. PRESENT THE STUDENTS WITH CHEMICAL LABELS. DEVELOP A SERIES OF TRUE OR FALSE AND OBJECTIVE QUESTIONS WHICH THE STUDENTS ARE TO ANSWER BY USING THE INFORMATION ON THE LABELS. THE STUDENTS SHOULD COMPLETE THE EXERCISE AT A LEVEL OF PERFORMANCE ESTABLISHED BY THE LOCAL TEACHER.
2. PRESENT THE STUDENTS WITH CONTAINERS THAT ARE TO BE DISPOSED. HAVE THE STUDENTS DISPOSE OF THE CONTAINERS ACCORDING TO THE DIRECTIONS ON THE CHEMICAL LABEL.
3. PRESENT THE STUDENTS WITH A CASE STUDY OF AN ACCIDENT WHILE CHEMICALS WERE BEING APPLIED BY A CHEMICAL APPLICATOR. USING AN ACCIDENT REPORT FORM USED BY CUSTOM SPRAYING SERVICES IN YOUR AREA, HAVE THE STUDENTS ACCURATELY COMPLETE THE ACCIDENT REPORT FORM.

E. INSTRUCTIONAL MATERIALS OR EQUIPMENT

1. EXAMPLES OF PROTECTIVE CLOTHING THAT MAY BE NEEDED WHEN WORKING WITH VARIOUS CHEMICALS, SUCH AS RESPIRATORS, RAIN HAT OR HARD HAT, COVERALLS OR WATER PROOF CLOTHING, RUBBER GLOVES, BOOTS, GOGGLES AND FULL FACE GAS MASK WITH CANNISTER AND FUME-TYPE FILTER

2. EXAMPLES OF VARIOUS CHEMICAL LABELS AND TECHNICAL PUBLICATIONS OR OTHER REFERENCES THAT GIVE SPECIFIC SAFETY INSTRUCTIONS
3. A SALES COUNTER
4. TAPE RECORDER
5. CHEMICAL CONTAINERS
6. CHEMICAL LABELS
7. COPIES OF STATE AND FEDERAL LAWS AND REGULATIONS
8. ACCIDENT REPORT FORMS
9. TOOLS NEEDED TO DISPOSE OF CONTAINERS SUCH AS SHOVELS AND PICKS

F. EXAMPLES OF SUPPORTING REFERENCES

1. AGRICULTURAL CHEMICALS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 9 PAGES.

A STUDENT REFERENCE, THIS PUBLICATION COVERS SUCH SAFETY TOPICS AS READING THE LABEL FOR SAFETY PRECAUTIONS, STATE CHEMICAL REGULATIONS, ACCIDENT REPORTS, SAFE HANDLING OF PESTICIDES, DISPOSAL OF CONTAINERS AND APPLYING HERBICIDES SAFELY.

2. CLARK, RAYMOND. AGRICULTURAL CHEMICALS. EAST LANSING, MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY. 1969, 39 PAGES.

INCLUDED IN THIS PUBLICATION, A STUDENT MANUAL FOR INDIVIDUALIZED INSTRUCTION SITUATIONS, IS A BRIEF SECTION REGARDING THE IMPORTANCE OF SAFETY IN CHEMICAL USAGE AND EIGHT SUGGESTED STUDENT ACTIVITIES.

3. INSECTICIDES. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1973, PP. 21-28, 41-48.

A STUDENT REFERENCE, THIS PUBLICATION COVERS SUCH TOPICS AS FEDERAL REGULATIONS IN USING INSECTICIDES, SAFETY PRACTICES IN MIXING AND APPLYING INSECTICIDES, DISPOSING OF USED CONTAINERS AND UNWANTED INSECTICIDES AND THE STORAGE OF UNUSED INSECTICIDES.

4. PUBLICATIONS AVAILABLE FROM YOUR LOCAL FIRST-AID UNIT.

THEY WILL SUPPLY PUBLICATIONS CONCERNING GENERAL PROCEDURES TO FOLLOW WHEN CHEMICAL POISONING IS SUSPECTED AND A LIST OF THE POISON CONTROL CENTERS FOR YOUR STATE.

APPENDIX A

RECOMMENDED MATERIALS OR EQUIPMENT

THIS LIST OF EQUIPMENT CAN BE USED AS A GUIDE IN ORDERING AND ASSEMBLING THOSE ITEMS NEEDED. MANY STATE DEPARTMENTS HAVE MORE DEFINITIVE LISTS AVAILABLE AND IT MAY BE DESIRABLE TO REQUEST SUCH LISTS AS ADDITIONAL SOURCES OF INFORMATION. IN ADDITION, CONSULTATION WITH EXPERIENCED AGRICULTURAL SUPPLIES AND SERVICES TEACHERS WOULD BE DESIRABLE AS NEEDED MATERIALS AND EQUIPMENT ARE BEING COMPILED.

REGISTER FOR MAKING CASH AND CHARGE TICKETS
ADDING MACHINES
CALCULATORS
BILLING EQUIPMENT, SWIVEL HAND
CASH REGISTER
TYPEWRITERS
PRICE BOARDS
WALL MERCHANDISING UNIT
MAGAZINE AND BULLETIN RACK
DISPLAY CASES OR WINDOWS
VIDEO TAPING EQUIPMENT
TAPE RECORDERS
TELEPHONES
SALES COUNTER
PORTABLE AUDIO-VISUAL EQUIPMENT STAND
ACCESS TO OVERHEAD PROJECTOR, MOVIE PROJECTOR, AND FILMSTRIP
AND SLIDE PROJECTOR
VOLUME MEASURES
HAND SPRAYER
COUNTER-TYPE CATALOGUE HOLDERS
CLIP BOARDS
THREE HOLE PAPER PUNCH
"IN" AND "OUT" BASKETS
MOISTURE TESTER
STAPLING GUN
SIGN MAKING KITS INCLUDING APPROPRIATE DRAWING AND SKETCHING
EQUIPMENT AND SUPPLIES
GRAIN TESTER
GRAIN PROBES (SAMPLING PROBES)
SAMPLING PANS
TRIERS
TRIER SAMPLING BAGS
SEED MAGNIFIER (HEAVY BASE)
MAGNIFYING LENSES

INVERTED GLASS JARS FOR DISPLAYING SEED AND GRAIN SAMPLES
CARDBOARD SEED SAMPLE BOXES
BAG TRUCK
FIRE EXTINGUISHER
ASSORTED ALUMINUM SCOOPS (HAND)
SHOVEL
SEALING TAPE MACHINE
TWINE
BUCKETS, PAILS, OR OTHER APPROPRIATE CONTAINERS
SOIL AUGERS OR SOIL PROBES
TAPE LABELER
SEED SCALES
COUNTER SCALES (60 LB. CAPACITY)
PLATFORM SCALES
FOLDING RULE

PROTECTIVE CLOTHING SUCH AS:

RAIN HAT OR HARD HAT
WATER PROOF CLOTHING
RUBBER GLOVES
BOOTS
GOGGLES
GAS MASK AND DUST MASK
RESPIRATOR

SEED IDENTIFICATION KIT
GRAIN IDENTIFICATION KIT
LABELING MATERIALS
POSTER BOARD
FEEDING AND MIXING GUIDES
CHEMICAL COMPATIBILITY CHARTS
BURLAP BAGS
OIL
GREASE
GREASE GUNS
VARIOUS SIZES OF PAPER BAGS

APPROPRIATE SMALL HAND TOOLS SUCH AS:

CLAW HAMMERS
HANDSAWS
SCREWDRIVERS
STEEL SQUARES
METAL RULERS
STEEL TAPE
HACKSAW
ELECTRICIANS SIDE CUTTING PLIERS
COMBINATION PLIERS
INSIDE CALIPERS

193/194

SOCKET SET, 3/8" DRIVE
NEEDLE NOSE PLIERS
ELECTRIC DRILL, 3/8" REVERSIBLE-VARIABLE SPEED DRILL
COMBINATION OPEN-BOX END WRENCH SET
DRILL SET 1/16" - 1/2" BY 64THS
TIN SNIPS

SMALL ENGINES TOOLS WHICH SHOULD BE AVAILABLE IN THE AGRICULTURAL MECHANICS LABORATORY

REPRESENTATIVE TAGS, LABELS, EMPTY SACKS OR CONTAINERS OF THE FOLLOWING:

FEEDS
SEEDS
FERTILIZERS
CHEMICALS

DIFFERENT SAMPLES OF:

FEED
SEEDS
FERTILIZERS
LIME
INSECTICIDES
HERBICIDES
FUNGICIDES

COPIES OF FORMS USED BY LOCAL AGRICULTURAL SUPPLY AND SERVICE FIRMS

APPENDIX B

SUGGESTED REFERENCES FOR INSTRUCTIONAL UNITS

ADVERTISING AND PROMOTION. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 34 PAGES.

AGRICULTURAL BUSINESS PROCEDURES. VAS 6004. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 1972, 32 PAGES.

AGRICULTURAL CHEMICALS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1972, 9 PAGES.

AGRICULTURAL CHEMICALS EMPLOYEE. COLLEGE STATION, TEXAS: DEPARTMENT OF AGRICULTURAL EDUCATION, TEXAS A & M UNIVERSITY.

AGRICULTURAL CHEMICALS - HERBICIDES, LESSON 4, HERBICIDE APPLICATION EQUIPMENT. BLACKSBURG, VIRGINIA: AGRICULTURAL EDUCATION DEPARTMENT, VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY. 1970, 15 PAGES.

AGRICULTURAL SALESMANSHIP: COURSE OUTLINE FOR AGRICULTURAL SUPPLY - SALES AND SERVICE OCCUPATIONS. COLUMBUS, OHIO: THE CENTER FOR VOCATIONAL AND TECHNICAL EDUCATION, THE OHIO STATE UNIVERSITY. 1965, 19 PAGES.

AGRICULTURAL SUPPLIES - SALES AND SERVICES FOR AREA VOCATIONAL CENTERS. MONTGOMERY, ALABAMA: STATE DEPARTMENT OF EDUCATION, AGRICULTURAL EDUCATION SERVICE. 55 PAGES.

AGRICULTURAL SUPPLIES - STUDENT STUDY GUIDE. MONTGOMERY, ALABAMA: STATE DEPARTMENT OF EDUCATION, AGRICULTURAL EDUCATION SERVICE. 154 PAGES.

AGRONOMY KIT. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 124 PICTURES

ANIMAL NUTRITION HANDBOOK. CURRENT EDITION. ST. LOUIS, MISSOURI: RALSTON PURINA COMPANY.

BE YOUR OWN CORN DOCTOR. WASHINGTON, D.C.: NATIONAL PLANT FOOD INSTITUTE. 4 PAGES.

BENDER, RALPH E. THE FFA AND YOU. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1962, 494 PAGES.

- BINKLEY, HAROLD AND HAMMONDS, CARLIE. EXPERIENCE PROGRAMS FOR LEARNING VOCATIONS IN AGRICULTURE. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1970, 604 PAGES.
- BLAND, BRIAN F. CROP PRODUCTION: CEREALS AND LEGUMES. NEW YORK, NEW YORK: ACADEMIC PRESS. 1971, 466 PAGES.
- BUNDY, CLARENCE, AND DIGGINS, RONALD V. LIVESTOCK AND POULTRY PRODUCTION. ENGLEWOOD CLIFFS, NEW JERSEY: PRENTICE-HALL, INC. 1968.
- BUSINESS PROCEDURES AND RECORDS. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1971, 101 PAGES.
- CLARK, RAYMOND. AGRICULTURAL CHEMICALS. EAST LANSING, MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY. 1969, 39 PAGES.
- CLARK, RAYMOND AND OEN, URBAN. ORGANIZATION AND FUNCTIONS OF AGRICULTURAL BUSINESS. EAST LANSING, MICHIGAN: DEPARTMENT OF SECONDARY EDUCATION AND CURRICULUM, MICHIGAN STATE UNIVERSITY. 1969, 19 PAGES.
- COOPERATION IN A FREE ENTERPRISE SOCIETY. COLUMBUS, OHIO: OHIO AGRICULTURAL EDUCATION CURRICULUM MATERIALS SERVICE, THE OHIO STATE UNIVERSITY. 1973, 206 PAGES.
- COURSE OF STUDY IN AGRICULTURAL OCCUPATIONS. LEXINGTON, KENTUCKY: DEPARTMENT OF AGRICULTURAL EDUCATION, UNIVERSITY OF KENTUCKY. 1967, 262 PAGES.
- DIGESTION IN ANIMALS. VAS 1026. URBANA, ILLINOIS: VOCATIONAL AGRICULTURE SERVICE, UNIVERSITY OF ILLINOIS. 8 PAGES.
- EDUCATION FOR AGRIBUSINESS OCCUPATIONS: A GUIDE TO SECONDARY SCHOOL COURSE PLANNING AND TEACHING. URBANA, ILLINOIS: AGRICULTURAL EDUCATION DIVISION, UNIVERSITY OF ILLINOIS. 1971, 59 PAGES.
- ENSMINGER, M.E. THE STOCKMAN'S HANDBOOK. DANVILLE, ILLINOIS: THE INTERSTATE PRINTERS AND PUBLISHERS, INC. 1970, 667 PAGES.
- FARM CHEMICALS HANDBOOK. WILLOUGHBY, OHIO: MEISTER PUBLISHING COMPANY. 1974, 470 PAGES.
- THE FERTILIZER HANDBOOK. WASHINGTON, D.C.: THE FERTILIZER INSTITUTE.
- GOOD FEED MIXING PRACTICES. LAFAYETTE, INDIANA: COOPERATIVE EXTENSION SERVICE, PURDUE UNIVERSITY.

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APPENDIX C

SELECTED LIST OF PROFESSIONAL AND TECHNICAL SOCIETIES
AND ORGANIZATIONS CONCERNED WITH AGRICULTURAL
SUPPLIES AND SERVICES AND ITS APPLICATION

INCLUSION OR OMISSION OF AN ORGANIZATION OR SOCIETY IN THIS LIST DOES NOT IMPLY APPROVAL OR DISAPPROVAL OF IT. ADDITIONAL INFORMATION REGARDING LOCAL CHAPTERS OR SECTIONS OF THESE ORGANIZATIONS OR SOCIETIES MAY BE OBTAINED BY WRITING DIRECTLY TO THE EXECUTIVE SECRETARY AT THE LISTED ADDRESS.

AGRICULTURAL NITROGEN INSTITUTE, 703 DUPONT BUILDING, 22 S. SECOND STREET, MEMPHIS, TENNESSEE 38103

AMERICAN DEHYDRATORS ASSOCIATION, ROOM 523, 5800 FOX RIDGE DR., MISSION, KANSAS 66202

AMERICAN FEED MANUFACTURERS ASSOCIATION, INC., 53 WEST JACKSON BLVD., CHICAGO, ILLINOIS 60604

AMERICAN POTASH INSTITUTE, INC., 1102 16TH STREET, N.W., WASHINGTON, D.C. 20036

ARIZONA GRAIN & SEED ASSOCIATION, P.O. BOX 1426, MESA, ARIZONA 85201

ARKANSAS DRIER & WAREHOUSEMAN'S ASSOCIATION, INC., P.O. BOX 710, HELENA, ARKANSAS 72342

CALIFORNIA GRAIN AND FEED ASSOCIATION, ROOM 114, 3333 WATT AVENUE, SACRAMENTO, CALIFORNIA 95821

CALIFORNIA WAREHOUSEMEN'S ASSOCIATION, 9 FIRST STREET, SAN FRANCISCO, CALIFORNIA 94105

CAROLINA-VIRGINIA GRAIN AND FEED DEALERS ASSOCIATION, P.O. BOX 2281, RALEIGH, NORTH CAROLINA 27602

COLORADO GRAIN & FEED DEALERS ASSOCIATION, 1711 PENNSYLVANIA, DENVER, COLORADO 80203

DISTILLERS FEED RESEARCH COUNCIL, INC., 1435 ENQUIRER BLDG., CINCINNATI, OHIO 45202

DULUTH GRAIN COMMISSION MERCHANTS' ASSOCIATION, 203 DULUTH
BOARD OF TRADE, DULUTH, MINNESOTA 55802

EASTERN FEDERATION OF FEED MERCHANTS, INC., BOX 248,
CLAVERACK, NEW YORK 12531

EASTERN SHORE GRAIN & FEED DEALERS, ASSOCIATION, C/O
CARGILL, SEAFORD, DELAWARE 19973

FARM & POWER EQUIPMENT RETAILERS OF OHIO, 4216 INDIANOLA
AVENUE, COLUMBUS, OHIO 43214

FARMERS ELEVATOR ASSOCIATION OF MINNESOTA, 852 GRAIN EXCHANGE,
MINNEAPOLIS, MINNESOTA 55415

FARMERS ELEVATOR ASSOCIATION OF SOUTH DAKOTA, BOX 579,
ABERDEEN, SOUTH DAKOTA 57401

FARMERS GRAIN DEALERS ASSOCIATION OF NORTH DAKOTA,
412 BLACK BLDG., FARGO, NORTH DAKOTA 58102

FEDERATION OF CASH GRAIN COMMISSION MERCHANTS ASSOCIATION,
1005 GRAIN EXCHANGE BLDG., MINNEAPOLIS, MINNESOTA 55415

THE FERTILIZER INSTITUTE, 1015 18TH STREET, N.W., WASHINGTON,
D.C. 20036

FLORIDA FEED ASSOCIATION, INC., 404 S. 10TH STREET,
GAINESVILLE, FLORIDA 32601

GEORGIA FEED ASSOCIATION, INC., C/O EDWARD E. SMITH & CO.,
ROOM 227, 3166 MAPLE DR. N.W., ATLANTA, GEORGIA 30305

GEORGIA GRAIN DEALERS ASSOCIATION, INC., P.O. BOX 56,
ARABI, GEORGIA 31712

GRAIN ELEVATOR & PROCESSING SUPERINTENDENTS ASSOCIATION,
BOARD OF TRADE, CHICAGO, ILLINOIS 60604

GRAIN & FEED ASSOCIATION OF ILLINOIS, 612 S. 2ND STREET,
SPRINGFIELD, ILLINOIS 62705

IDAHO FEED AND GRAIN ASSOCIATION, INC., BOX 600, BURLEY,
IDAHO 83318

INDIANA GRAIN & FEED DEALERS ASSOCIATION, INC., 505 BOARD OF
TRADE BLDG., INDIANAPOLIS, INDIANA 46204

IOWA FERTILIZER & CHEMICAL ASSOCIATION, 541-31ST STREET,
DES MOINES, IOWA 50312

IOWA GRAIN & FEED ASSOCIATION, 201 SHOPS BLDG., DES MOINES,
IOWA 50309

KANSAS GRAIN & FEED DEALERS ASSOCIATION, 1217 HILTON TOWER,
HUTCHINSON, KANSAS 67501

KENTUCKY FEED & GRAIN ASSOCIATION, P.O. BOX 425, LEXINGTON,
KENTUCKY 40501

LOUISIANA GRAIN & FEED DEALERS ASSOCIATION, INC., KNAPP HALL,
LOUISIANA STATE UNIVERSITY, BATON ROUGE, LOUISIANA 70803

MICHIGAN BEAN SHIPPERS ASSOCIATION, 500 EDDY BLDG., SAGINAW,
MICHIGAN 48604

MICHIGAN GRAIN & AGRI-DEALERS ASSOCIATION, P.O. BOX 9132,
LANSING, MICHIGAN 48909

MIDSOUTH SOYBEAN & GRAIN SHIPPERS ASSOCIATION, P.O. BOX 687,
BLYTHEVILLE, ARKANSAS 72315

MIDWEST FEED MANUFACTURERS' ASSOCIATION, 934 WYANDOTTE STREET,
KANSAS CITY, MISSOURI 64105

THE MINNEAPOLIS GRAIN COMMISSION MERCHANTS ASSOCIATION,
824 FLOUR EXCHANGE BLDG., MINNEAPOLIS, MINNESOTA 55415

MISSISSIPPI FEED & GRAIN ASSOCIATION, BOX 4357, JACKSON,
MISSISSIPPI 39216

MISSOURI AG-INDUSTRIES COUNCIL, INC., BOX 19197, KANSAS CITY,
MISSOURI 64141

NATIONAL FERTILIZER SOLUTIONS ASSOCIATION, 910 LEHMANN BLDG.,
PEORIA, ILLINOIS 61602

NATIONAL GRAIN & FEED ASSOCIATION, 500 FOLGER BLDG., 725 15TH
STREET, N.W., WASHINGTON, D.C. 20005

NEBRASKA GRAIN & FEED DEALERS ASSOCIATION, 522 TERMINAL BLDG.,
LINCOLN, NEBRASKA 68508

NEW ENGLAND GRAIN & FEED COUNCIL, P.O. BOX 475, FITCHBURG,
MASSACHUSETTS 01420

NEW MEXICO GRAIN & FEED DEALERS ASSOCIATION, ALBUQUERQUE,
NEW MEXICO 87110

NORTHEASTERN POULTRY PRODUCERS COUNCIL, 322 OXFORD VALLEY
ROAD, FAIRLESS HILLS, PENNSYLVANIA 19030

NORTHWEST AGRI-DEALERS ASSOCIATION, INC., P.O. 354, MANKATO,
MINNESOTA 56001

NORTHWEST COUNTRY ELEVATOR ASSOCIATION, 920 GRAIN EXCHANGE
BLDG., MINNEAPOLIS, MINNESOTA 55415

N.W. FEED MANUFACTURERS ASSOCIATION, BOX 67, MINNEAPOLIS,
MINNESOTA 55440

OHIO AGRICULTURAL COUNCIL, 632 BEAUMONT ROAD, COLUMBUS,
OHIO 43212

OHIO GRAIN, FEED AND FERTILIZER ASSOCIATION INC., 5625
NORTH HIGH STREET, P.O. BOX 151, WORTHINGTON, OHIO 43085

OHIO PESTICIDE INSTITUTE, 83 SOUTH HIGH STREET, COLUMBUS,
OHIO 43215

OHIO SOIL FERTILITY & EDUCATION SOCIETY, 1885 NEIL AVENUE,
COLUMBUS, OHIO 43210

OKLAHOMA GRAIN & FEED DEALERS ASSOCIATION, P.O. BOX 1747,
ENID, OKLAHOMA 73701

OMAHA CASH GRAIN COMMISSION MERCHANTS' ASSOCIATION, 606
GRAIN EXCHANGE, OMAHA, NEBRASKA 68102

OREGON FEED, SEED & SUPPLIERS ASSOCIATION, 1812, N.W.
KEARNEY STREET, PORTLAND, OREGON 97209

PACIFIC NORTHWEST GRAIN DEALERS ASSOCIATION, INC., 514
PEYTON BLDG., SPOKANE, WASHINGTON 99201

PANHANDLE GRAIN & FEED DEALERS ASSOCIATION, AMARILLO
GRAIN EXCHANGE, AMARILLO, TEXAS 79105

PENN AG INDUSTRIES, 119 E. MAIN STREET, BOX 329, EPHRATA,
PENNSYLVANIA 17522

SIOUX CITY GRAIN & FEED ASSOCIATION, P.O. BOX 341, SIOUX
CITY, IOWA 51101

SOUTH DAKOTA FERTILIZER & AG CHEMICAL ASSOCIATION,
116 N. EUCLID, PIERRE, SOUTH DAKOTA 57501

SOUTH TEXAS COUNTRY ELEVATOR ASSOCIATION, INC., P.O.
BOX 1021, RAYMONDVILLE, TEXAS 78580

TEXAS GRAIN & FEED ASSOCIATION, 1201 SINCLAIR BLDG.,
FORT WORTH, TEXAS 76102

205/206

UTAH FEED MANUFACTURERS & DEALERS ASSOCIATION, ANIMAL SCIENCE
DEPARTMENT, UTAH STATE UNIVERSITY, LOGAN, UTAH 84321

WEST TEXAS GRAIN ELEVATOR ASSOCIATION, P.O. BOX 150, TULIA,
TEXAS 79088

WEST VIRGINIA FEED DEALERS ASSOCIATION, P.O. BOX 1479,
HUNTINGTON, WEST VIRGINIA 25716

WISCONSIN FEED, SEED & FARM SUPPLY ASSOCIATION, INC.,
152 W. WISCONSIN AVENUE, MILWAUKEE, WISCONSIN 53203

THE WYOMING GRAIN, FEED AND SEED DEALERS ASSOCIATION,
BOX 3251, LARAMIE, WYOMING 82070

APPENDIX D

CURRICULUM GUIDES USED IN DEVELOPING THE
AGRICULTURAL SUPPLIES AND SERVICES GUIDE

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